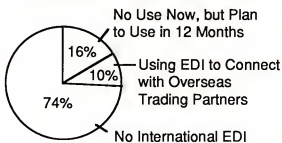


19. EDI (ED)

International EDI Usage



ED- 1

INPUT

Network versus Software Functionality

Function	User Site Software	Network
Store and forward	✓	✓
Translation	✓	✓
Interconnection		✓
Real-time EDI	✓	

ED- 2

INPUT

Network versus Software Functionality

Function	User Site Software	Network
Transaction data bases		✓
Media conversion		✓
EDI to fax, E-mail compliance checking	✓	✓

ED- 3

INPUT

Network versus Software Functionality

Function	User Site Software	Network
Control reports	✓	✓
Trading partner program		✓
Telecom expertise		✓

ED- 4

INPUT

Trends in EDI Software Offerings

- Migration of value-added network services to customer-site software
- Communication gateway/EDI server architecture
- Three-tiered market for message-switching software

ED- 5

INPUT

Trends in EDI Software Offerings

- Event-driven and real-time architectures
- EDI interfaces built into application programs
- Inexpensive translation software/turnkey solutions

ED- 6

INPUT

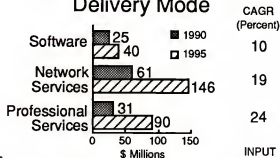
Trends in EDI Software Offerings

- New sources of EDI software
- Market consolidation
- EDI/EFT software
- Softness in midrange market
- Programming tools in translation software

ED-7

INPUT

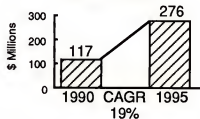
EDI Market Growth by Delivery Mode



ED-8

INPUT

The U.S. EDI Services and Software Market, 1990-1995



ED-9

INPUT

Breakout of Revenues for EDI Service Providers

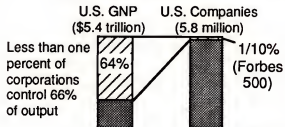
Customer Base Percentile	Average Network Revenue (\$)
80	2,000
15	10,000
5	18,000

Customer base as of mid-year 1990

ED-10

INPUT

Will a "Macro" 80-20 Rule Limit EDI Growth?



ED-11

INPUT

How to Read the EDI Input-Output Matrix

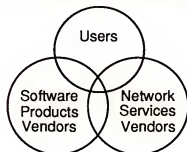
- Read down columns to see a sector's suppliers
- Read across rows to see a sector's customers

ED-12

INPUT



EDI Players Overlap



ED-13

EDI Input-Output Matrix

Sellers	Buyers			
	Auto	Apparel	Electronics	Aerospace
Auto	■			
Apparel		■		
Electronics			■	■
Aerospace				■

INPUT

ED-14

Future Growth Opportunities of EDI

Opportunities

Expanding number of EDI users	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Expanding EDI trade relationships	<input checked="" type="checkbox"/>		<input type="checkbox"/>

☒ Networks ☒ Software Vendors ☐ Prof. Serv. Firms

INPUT

ED-15

Future Growth Opportunities of EDI

Opportunities

Advanced services			
Data bases	<input checked="" type="checkbox"/>		
Funds transfers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Graphics exchange	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

☒ Networks ☒ Software Vendors ☐ Prof. Serv. Firms

INPUT

ED-16

Future Growth Opportunities of EDI

Opportunities

Advanced services			
Real-time EDI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EDI servers/gateways		<input checked="" type="checkbox"/>	

☒ Networks ☒ Software Vendors ☐ Prof. Serv. Firms

INPUT

ED-17

Future Growth Opportunities of EDI

Opportunities

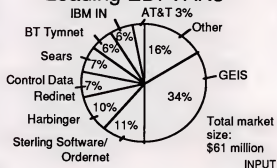
Systems integration services	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
New EDI applications (vertical markets)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

☒ Networks ☒ Software Vendors ☐ Prof. Serv. Firms

INPUT

ED-18

Leading EDI VANs



ED-18

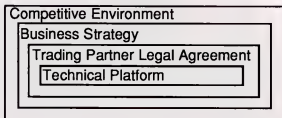
EDI Integration Tools and Technologies

- EDI software products
- Messaging systems and work group environments
- Automatic identification
- Data capture

ED-20

INPUT

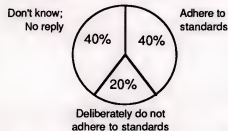
The Operational Context of EDI



ED-21

INPUT

Less Than Half of EDI Users Adhere to Standards



ED-22

INPUT

EDI Standards Issues/Trends

- Not accommodating business practices
- Incapable of characterizing products
- Evolution leads to errors
- Hierarchical design hard to process

ED-23a

INPUT

EDI Standards Issues/Trends

- Quick transaction sets
- People data formats
- Real-time EDI formats
- Redundant/unnecessary data elements
- Standards bodies not fast enough

ED-23b

INPUT



The Four Basic Transactions

- Logistical
- Balancing
- Quality
- Change

ED- 23

INPUT

Selected Strategic Impacts of EDI

- New products and services possible
- Corporate boundaries redefined
- Value chains restructured

ED- 24

INPUT

Selected Tactical Impacts of EDI

- Workflow and job description changes
- Accounting changes
- Control of company resources

ED- 25

INPUT

EDI Is for Repetitive Well-Defined Purchases

Product-feature ambiguity	high	Big ticket items (IBM 3090...)	Fashion apparel	← EDI
	low	Once-a-year expenditures	Office supplies	
		low	Commercial exchange recurrence	high

ED- 26

INPUT

Electronic Commerce

The New Foundation for Trade

ED- 27

INPUT

Electronic Commerce Definition

The end-to-end digital exchange of all information needed to conduct business

ED- 28

INPUT



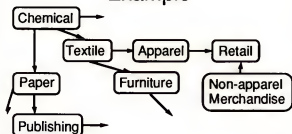
Electronic Commerce Examples

- ATMs and POS systems
- Computer reservation systems
- Electronic securities markets
- EDI use in retail distribution

ED- 29

INPUT

Trading Community Example



ED- 31

INPUT

Electronic Commerce Integration of Trading Communities: Example

- AgriData Resources Inc.
 - Farmers
 - Farm equip. mfgs., distributors
 - Veterinary supplies
 - Commodity markets
 - Weather news

ED- 33

INPUT

Electronic Commerce

Trading Community

- A company, its trading partners, and the trading partners of its trading partners
- An expanded vertical market
- An external perspective

ED- 30

INPUT

Input - Output Analysis

Sellers	Buyers			
	Auto	Apparel	Electronics	Aerospace
Auto				
Apparel				
Electronics				
Aerospace				

ED- 32

INPUT

Electronic Commerce

Reorganization of Work

- Trading community wide
- Elimination of intermediaries
- Standardization of processes
- Alliances based on information technology

ED- 34

INPUT



Reorganization of Work

- Company wide
 - Automation-induced staff reductions
 - Outsourcing (e.g., data processing, customer service, telemarketing)
 - Distributed work groups

ED- 36

INPUT

Reorganization of Work Requirements

- Understand that work is accomplished through communication/transactions among people
- EC technologies change the possibilities/costs for these communications

ED- 36

INPUT

Tools for Applying Electronic Commerce

- Workflow analysis
- Transaction-cost analysis
- Input-output analysis

ED- 37

INPUT

Construction of Infrastructure

- Transcorporate participation (e.g., standards bodies, alliances, consortia)
- Competitive issues
- Financial issues

ED- 36

INPUT

Competitive Issues

- IS users become IS vendors
- Peripheral services become central profit centers (e.g., airline reservation, car financing)
- Key strategy: market dominance/ monopoly

ED- 39

INPUT

Financial Issues

- EC is a capital, not operations, expense
- Costs spread over whole trading communities, not single firm
- Early adopters often subsidize later adopters (e.g., EDI)

ED- 40

INPUT



Electronic Commerce

Driving Forces

- Speed—reduced cycle times
- Cost—reduced transaction costs
- Customer satisfaction
- Profit—new products leveraging existing expertise

ED-41

INPUT

Electronic Commerce

Inhibiting Factors

- Technical incompatibilities
 - Conflicting standards
 - Proprietary systems
- Conflicting practices of different industries

ED-42

INPUT

Electronic Commerce

Inhibiting Factors

- Management's lack of awareness of EC possibilities
- Difficulty in protecting intellectual property and intangible assets
- Huge investment and risk
- Resistance to change

ED-43

INPUT

INPUT's Electronic Commerce Research Program

- Definition and framework
- Trading community analysis
- Integration issues
- Monthly newsletter
- Hotline

ED-44

INPUT

Trading Communities Studied

- Health care
- Travel and tourism
- Grocery/agribusiness
- Textile, apparel, retail

ED-45

INPUT

Trading Communities Studied

- Publishing, communications, education
- Federal government
- Transportation/international trade

ED-46

INPUT



Electronic Commerce

U.S. Health Care Trading Community

ED-47

INPUT

U.S. Health Care Trading Community Players

Providers	Examples
Supplies	Pharmaceutical, grocery, chemical, etc.
Services	Doctors, distributors, hospitals, info. services

ED-48a

INPUT

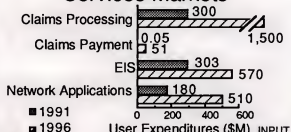
U.S. Health Care Trading Community Players

Providers	Examples
Funds	Banks, insurers, patients, governments

ED-48b

INPUT

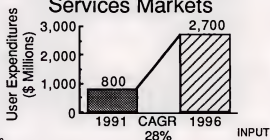
U.S. Health Care Trading Community Electronic Commerce Services Markets



ED-49

User Expenditures (\$M) INPUT

U.S. Health Care Trading Community Electronic Commerce Services Markets



ED-50

INPUT

U.S. Health Care Trading Community Electronic Commerce Issues

- Industry administrative costs
- Proliferation of service providers
- Government reform initiatives
- Industry reform initiatives

ED-51a

INPUT



U.S. Health Care Trading Community
**Electronic Commerce
Issues**

- Consolidation of supply channels
- Industry versus proprietary standards
- Health care EDI corporation

ED-51b

INPUT

U.S. Health Care Trading Community
**Electronic Commerce
Future Trends**

- Administrative costs reduced
 - Currently 24% or \$160 billion
- Electronic commerce expenditures expand
 - Currently <1% of admin. costs

ED-52a

INPUT

U.S. Health Care Trading Community
**Electronic Commerce
Future Trends**

- Industry consolidation—suppliers and providers
- Industry specialization—providers
- More pervasive use of industry standards

ED-53b

INPUT

Definition of EDI

- EDI is the application-to-application exchange of intercompany business data in structured, standard data formats

ED-53

INPUT

**Definiton of
Electronic Commerce**

- Electronic commerce is the electronic, network-based coordination of material, people, and processes that facilitates commercial exchange

ED-54

INPUT

Electronic Commerce

Components

Component	Description
Organization	Trading communities
Network	Interorganization communications

ED-55a

INPUT



Electronic Commerce

Components

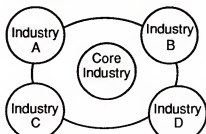
Component	Description
Interfaces	Translation processes Standards for interaction
New business processes	Electronic based

INPUT

ED-55b

Electronic Commerce

Trading Community

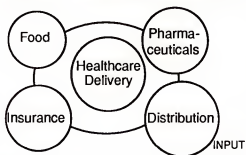


INPUT

ED-56

Electronic Commerce

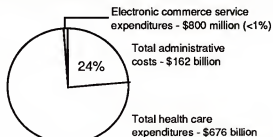
Healthcare Trading Community



INPUT

ED-57

Expenditures on Electronic Commerce Services: Health Care



INPUT

ED-58

Electronic Commerce

Effects and Dynamics

- Participation of many parties
- Business transaction becomes the focus
- Restructuring of industry processes
- Restructuring of trading community
- Users become vendors

INPUT

ED-59a

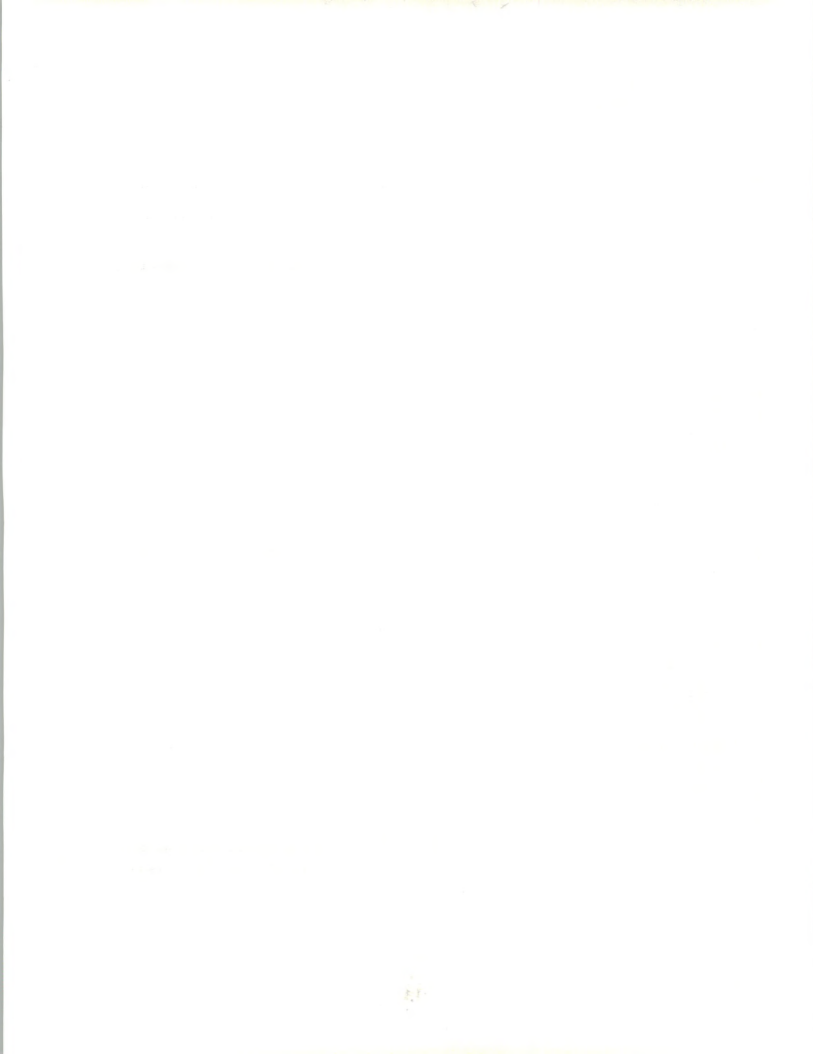
Electronic Commerce

Effects and Dynamics

- New economies of scale - community versus individual organization-based
- High risk for early adopters
- Unpredictable alliances

INPUT

ED-59b



Webster's Definition: Commerce

Commerce (1) social intercourse: dealings between individuals or groups in society: interchange of ideas, opinions, or sentiments: interrelationship, connection, or communication. (2) the exchange or buying and selling of commodities especially on a large scale and involving transportation from place to place.

ED- 60

INPUT

Tools for Assessing EC Opportunities and Re-engineering Work

- Input-output analysis
- Speech-action analysis
- Transaction analysis
- Activity-based accounting
- Economics of network technologies

ED- 62

INPUT

Community Efficiency

- Community revenue vs. EC cost
- Community revenue vs. GNP
- Community employment/productivity changes
- Industry coordination factor

ED- 64

INPUT

Industries Most Impacted by Electronic Commerce

- Communications: media, publishing, information providers, education
- Transportation and distribution
- Finance
- Healthcare
- Government (potential)

ED- 61

INPUT

Financing the Electronic Commerce Infrastructure

- Early adopters vs. later adopters
- Large hub users vs. small spoke users
- Third-party community systems integrators
- Trade groups
- Vendor perspectives (LINX vs. ACES)

ED- 63

INPUT

Changes to the Enterprise

- Workflow re-engineering
- Faster cycle times
- Changed profit centers
- Changes in mgt. focus/company identity

ED- 65a

INPUT



Changes to the Enterprise

- Changes in accounting systems and definitions
- Change in use of management information

INPUT

ED- 66b

Changes to the Competitive Environment

- Elimination of intermediaries
- New outsourcing service options/niches
- Shifted transaction costs
- Users becoming vendors

INPUT

ED- 66a

Changes to the Competitive Environment

- Product pricing
- Product changes (new and improved products)

INPUT

ED- 66b

Impacts of Electronic Commerce

- Changes to competitive environment
- Changes to the enterprise
- Community efficiency
- Financing the EC infrastructure

INPUT

ED- 67

Infrastructure Utilities

- Directories, data bases
- Message standards
- Other standards (operating systems)
- Classification systems: product, company location codes

INPUT

ED- 66

Needed Electronic Commerce Services

- Infrastructure utilities
- System development tools
- Real time
- Payment services

INPUT

ED- 66a



Needed Electronic Commerce Services

- Community-wide solutions
- Information flow from consumer to producer

INPUT

ED- 69b

Industry Growth Projection—Selected Industries

	Projected Growth (12 Months)	
	Trading Partners (%)	EDI Expenditures (%)
Discrete mfg.	15	(7)
Process mfg.	58	40
Transportation	46	39

INPUT

ED- 70a

Industry Growth Projection—Selected Industries

	Projected Growth (12 Months)	
	Trading Partners (%)	EDI Expenditures (%)
Distribution	42	38
Banking	448	27

INPUT

ED- 70b

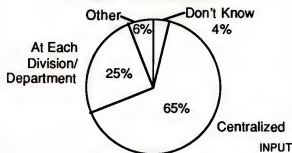
Conditions Favoring EDI Use (Multiple Possible)

	Percent
Repetitive orders with major trading partners	68
Use only with those partners requesting it	30
Small dollar amounts	14
Other conditions (none > 5%)	25

INPUT

ED- 71

Most Common Location of EDI Translator



INPUT

ED- 72

Top 5 EDI Applications

Application	EDI Users (%)
Purchasing	50
Sales/order entry	38
Accounts payable	35
Funds transfer	33
Traffic management	27

INPUT

ED- 73

1000

1000

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1000

EDI Usage/Support, 1991 Average—Large Companies

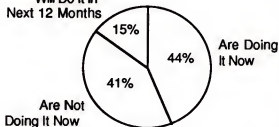
	EDI Exp. (\$000)	S + F	TPs	% of \$ POs	Sat.
> \$1 billion	479	16	432	28	3.6
Over \$1 million- to \$1 billion	132	7	58	10	3.3

INPUT

ED-74

EDI/EFT

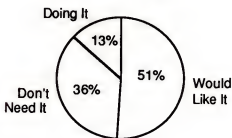
Will Do It in
Next 12 Months



INPUT

ED-75

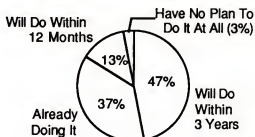
Real-Time EDI



INPUT

ED-76

International EDI



INPUT

ED-77

VAN Services Used With EDI

Type of Service	% Noted in User Survey
Basic service	67
Electronic mail	38
EFT	27
Trading partner implementation prog.	23

INPUT

ED-78a

VAN Services Used With EDI

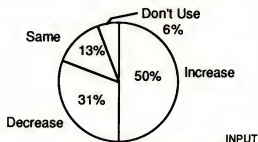
Type of Service	% Noted in User Survey
On-line catalogs, data bases, directories	13
Other	25
None	8

INPUT

ED-78b



Forecast Changes in VAN Usage Patterns by EDI Users



ED- 79

INPUT

EDI Message Traffic Perceived Changes

Change	Percent Noting
Increase in message traffic	41
Decrease in message traffic	7
No change in message traffic	52

ED- 80

INPUT

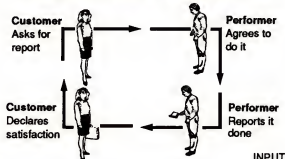
Most Common EDI Implementation Objectives

- Improve operational efficiency
- Reduce costs
- Attain or maintain competitive advantage
- Improve customer relationships
- EDI-related partnering improvements and customer requirements

ED- 81

INPUT

The Basic Action Workflow



ED- 82

INPUT

Transactions and the In-House/Outsourcing Decision

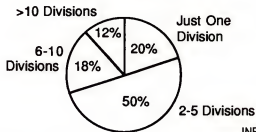
- The limit to the size of the firm is set where its costs of organizing a transaction become equal to the cost of carrying it out through the market. This determines what the firm buys, produces, and sells.

—R.H. Coase, Univ. of Chicago

ED- 83

INPUT

Number of Internal Divisions Doing EDI



ED- 84

INPUT



1990-1991 EDI Spending (Companies with > \$400 M in Annual Fees)

Attribute	1990	1991	% Change
Avg. expenditures on all EDI activity	\$268,000	\$321,000	20
Avg. number of trading partners	322	544	69
Avg. spending per trading partner	\$832	\$591	(29)

INPUT

ED-85

EDI as a Customer Interface

- The average EDI user
 - Has 196 customers using EDI
 - Receives 22% of POs via EDI, which represents 32% of total dollar volume of all POs received

INPUT

ED-86a

EDI as a Customer Interface

- The average EDI user
 - Would need to have approximately 450 customers before EDI submission would represent 50% of POs received
 - At that level, the EDI POs would represent 73% of PO \$ volume

INPUT

ED-86b

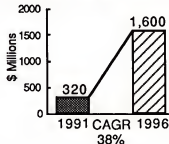
Issues of Electronic Commerce

- Integration
- Education
- Finance
- Alliances—"Coop-etition"
- Work and industry reorganization
- Monopoly and scale economies
- Accounting metrics

INPUT

ED-87

U.S. Health Care EDI Software and Services



INPUT

ED-88

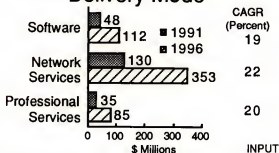
EDI Market Main Points

- Still solid growth
- Slowing in manufacturing
- New services
- New architecture needed?
- Diminishing/new VAN role
- Expand to "Electronic Commerce" perspective

INPUT

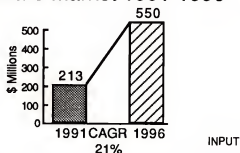
ED-89

EDI Market Growth by Delivery Mode



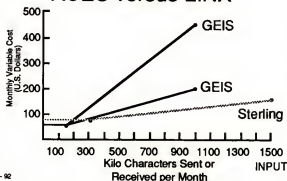
ED-90

U.S. EDI Services and Software Market 1991-1996



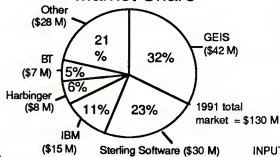
ED-91

ACES versus LINX



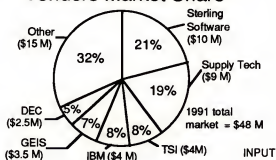
ED-92

1991 Leading EDI VANs Market Share



ED-93

1991 Leading EDI Software Vendors Market Share



ED-94

Mainstream EDI Markets

- Manufacturing
- Transportation
- Distribution

ED-95



Specialized EDI Markets

- Health care
- Finance
- Government

ED- 96

INPUT

Emerging EDI Markets

- Travel and tourism
- Communications/media
- Education
- Construction

ED- 97

INPUT

Marketing EDI Success Factors

- Integration consulting and education
- Trading partner implementation programs
- Hub-spoke approach
- Software and network services

ED- 98

INPUT

Telephone Company Activity in EDI

- | | |
|-----------------|--------------|
| • AT & T | • Bell South |
| • US Sprint | • Ameritech |
| • MCI | • Nynex |
| • Bell Atlantic | • GTE |

ED- 99

INPUT

Electronic Commerce Examples

Agribusiness - ARI Network Services
Pharmaceuticals - Sterling Software
Insurance - IVANs
Retail - Sears, Wal-Mart
Transportation - (Port Systems)
Retail - Transnet

ED- 100

INPUT

Electronic Commerce Impacts

- Re-engineering value chains
- Re-engineering enterprises
- Community efficiency
- Financing the infrastructure
- Marketing the solution

ED- 101

INPUT



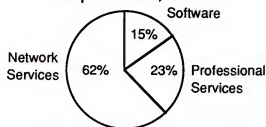
Requirements of Electronic Commerce

- System utilities
- Standards/classification systems
- Network services
- Community-wide solutions
- New accounting metrics

ED-102

INPUT

European EDI Market Components, 1991

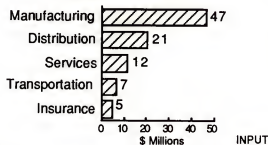


Total market = \$100 million

ED-103

INPUT

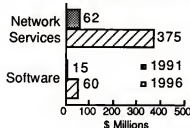
Leading European EDI Industries, 1991



ED-104

INPUT

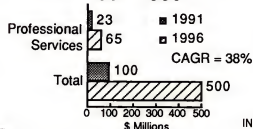
EDI Software and Services Market—Western Europe, 1991-1996



ED-105a

INPUT

EDI Software and Services Market—Western Europe, 1991-1996



ED-106b

INPUT

Distribution of Customer Revenues by Percentile for EDI Network Services

Customer Base Percentile	Average Annual Network Revenue (\$)
85	2,000
14	11,000
1	60,000

ED-106

INPUT

TABLE 1		TABLE 2	
List of species and their distribution		List of species and their distribution	
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
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94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

Grocery Electronic Commerce

Service	\$ Millions
EDI	20
Card processing	510
Check authorization	200
Electronic marketing	100

ED- 107a

INPUT

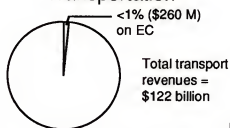
Grocery Electronic Commerce

Service	\$ Millions
Product movement	450
Commodity markets	300
Other	200
Total	1,780

ED- 107b

INPUT

Expenditures on Electronic Commerce Services: Transportation



ED- 108

INPUT

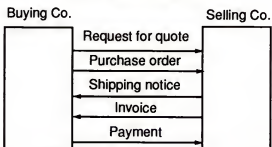
Electronic Commerce: Health Care

Application	\$ Millions
EDI	17
Claims processing	300
Claims payment	<1
Electronic information services	303
Network applications	180
Total	800

ED- 109

INPUT

EDI Messages



ED- 110

INPUT

Electronic Commerce: The New Institutional Framework

- Monopoly
- Standardization
- Finance
- Ownership
- Marketing
- Education

ED- 111

INPUT



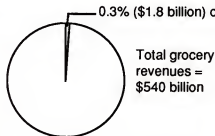
EDI Vendor Opportunities and Strategies

- Community solution/targeting
- Data bases and utilities
- Suite of software and services
- EFT, real time, international services

INPUT

ED-112

Expenditures on Electronic Commerce Services: Grocery



INPUT

ED-114

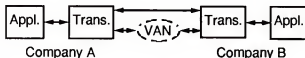
Trends in EDI

- Consolidation of vendors
- Price competition
- Growing diversity of EDI applications
- Users slow to integrate
- EDI architecture changing

INPUT

ED-113

The Different Kinds of Real-Time EDI



INPUT

ED-115

PC Software Markets

	1991 (\$M)	90-91 Growth (%)
EDI	30	50
Workflow	120	-
Spreadsheet	950	35

INPUT

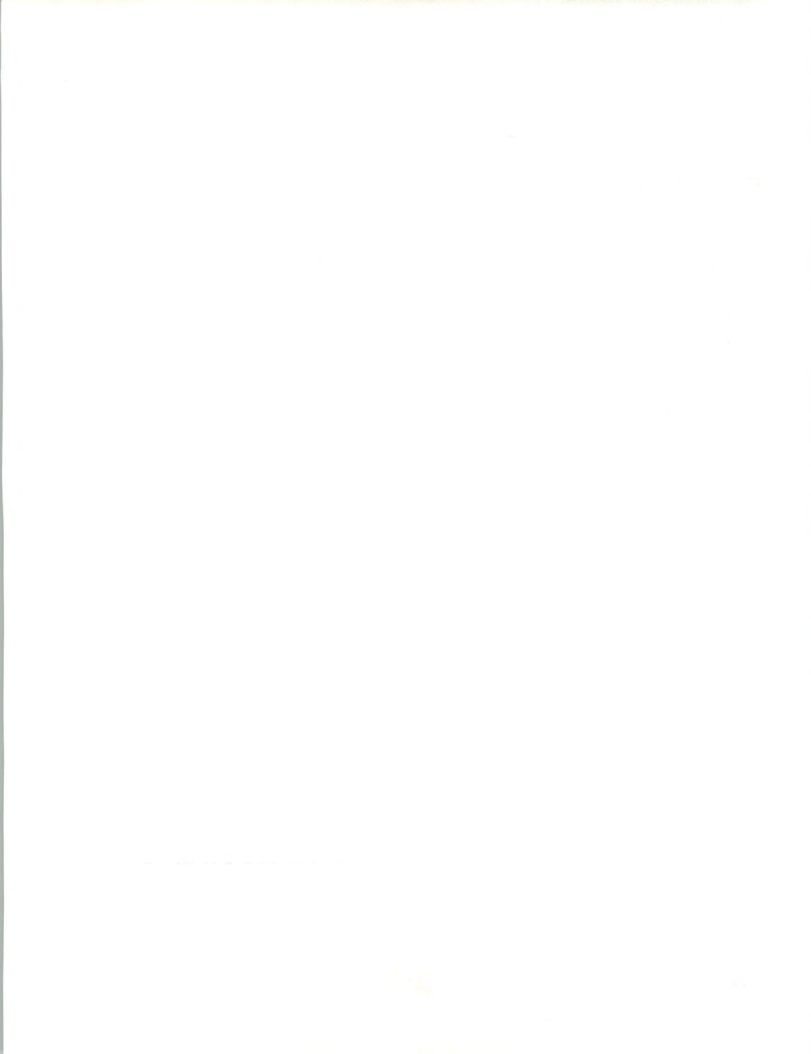
ED-116a

PC Software Markets

	1991 (\$M)	90-91 Growth (%)
Data Base	400	15
Word Processing	1,100	24
Accounting	933	20

INPUT

ED-116b



3rd Party Network Markets

	1991 (\$M)	CAGR 91-96 (%)
EDI	148	22
E-Mail	350	23
ED/EFT	13	50

ED-117

INPUT

Electronic Commerce

The use of electronic systems to facilitate the many kinds of communications involved in a commercial transaction.

Doing business electronically

ED-118

INPUT

Ostensible EC Losers

- Paper manufacturers
- Printing companies
- U.S. postal service
- Postal meter manufacturers
- Forms printers
- Mints
- File cabinet manufacturers

ED-119

INPUT

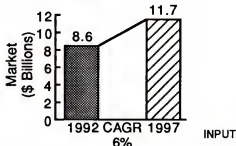
Ostensible EC Winners

- Telecommunications networks
- Credit card service vendors
- Software companies
- Media/intellectual property holders

ED-120

INPUT

U.S. EC Software and Service Market



ED-121

INPUT

Electronic Commerce Market

Key Industries

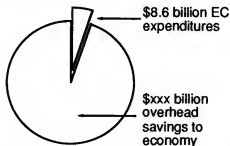
- Government
- Health care
- Transport/Logistics
- Distribution
- Banking
- Manufacturing
- Media
- Travel/Tourism

ED-122

INPUT



Electronic Commerce Market Effective versus Latent Value



ED-125

INPUT

Key Economic Trends

- Service sector biggest
- Power shift: manufacturing to dist., retail, service
- Confederations replace vertical integration
- Protracted economic dislocation
- Retrenchment of big government

ED-125

INPUT

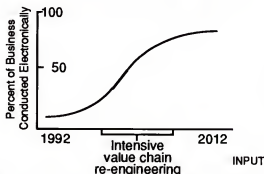
Electronic Commerce Technologies

- EDI
- POS
- EDI/EFT
- E-mail/Groupware
- Facsimile
- Electronic information services

ED-127

INPUT

Paperless Society—When?



ED-124

INPUT

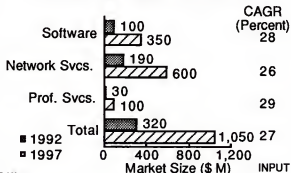
Information Technology Drivers

- PC and LAN proliferation
- Facsimile: the bridge between paper and paperless
- Global telecom infrastructure
- Voice/data/video/image integration

ED-126

INPUT

U.S. EDI Market Growth



ED-128

INPUT



Grocery EC Services (\$ M)

POS	Card processing	510
	Product movement	450
	Check authorization	200
	Electronic marketing	100
	Commodity markets	300
	EDI	20
	Other	200
		INPUT

ED-129

Electronic Information Services

- Directories
- Product catalogs
- Market data
- Product information logistics
- On-line versus CD ROM

INPUT

ED-130

Electronic Commerce Technologies

- Automatic identification
- Computer-telephone integration
- Video
- Image

INPUT

ED-131

EC Services

- Professional services
 - Education
 - Systems integration
 - Community facilitation
- Network and processing services
- Outsourcing

INPUT

ED-132

EC Users

- Distribution: Wal-Mart
- Trans.: Cass Logistics, Maersk
- Gov't.: Customs, IRS, commissaries, CALS
- Mfg.: Texas Instruments
- Media: Donovan Data Systems, McGraw Hill

INPUT

ED-133

EC Vendors

- Still nascent industry
- Most established: GEIS, AT&T, BT, SSW, IBM, EDS
- Coming: FPMC, Amex, Intel, Motorola, Lotus, Microsoft, CATV, Publishers, Cellular

INPUT

ED-134

EC Opportunities

- Integrating internal and external networks
- Combining consumer and corporate EC
- Providing pricing, payment, and accounting services
- Providing global services

ED-135

INPUT

EC Threats

- Customer obliteration
- Customer/supplier becoming competitor
- Slow economy; lack of commerce

ED-136

INPUT

1997 EC Scenario

- EDI vendors consolidated
- EDI is component of broader offering
- User-vendor alliances
- Media and IS/IT industries coverage
- Virtual organizations; factory "servers"

ED-137

INPUT

Vendor Agenda

- Decide: Technology or solutions provider?
- Make alliances
- Acquire vertical market expertise

ED-138

INPUT

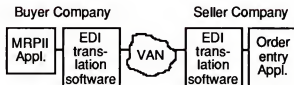
User Agenda

- Streamline workflow
- Do key competences; outsource the rest
- Buy on price
- Can you be an EC vendor?

ED-139

INPUT

Components of EDI

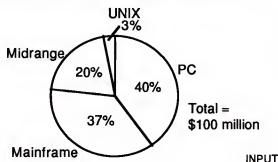


ED-140

INPUT



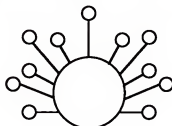
1992 EDI Software Market



ED-141

INPUT

EDI Usage Grows in a Hub and Spoke Pattern



ED-142

INPUT

Most Common EDI Applications

Application	Rank
Order entry	1
Accounts receivable	2
Purchasing	3
Accounts payable	4
Inventory	5

INPUT

ED-143

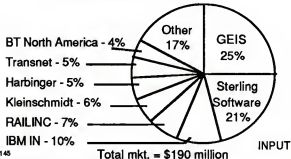
EDI Implementation Success Factors

- Executive charter
- Formal strategy
- Multidepartment task force
- EDI coordinator
- Close interaction with vendors

INPUT

ED-144

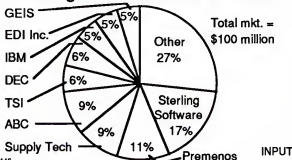
1992 Market Share Leading EDI VANS



ED-145

INPUT

1992 Market Share Leading EDI Software Vendors



ED-146

INPUT



EDI Professional Services

Vendor	1992 Revenues (\$ M)
EDS	5.0
IBM Information Network	4.0
Price Waterhouse	2.5
Andersen Consulting	2.0
Other	16.5
Total	30.0

INPUT

ED-147

Case Study

- Allison Manufacturing
- Product: Sportswear
- Sales: \$70 million
- EDI trading partners: 12 customers
- Sales volume by EDI: 12%
- EDI transactions: P.O., invoice
- PC software; 2 networks

INPUT

ED-148

X12 and EDIFACT Syntax

Interchange

Functional group

Message or transaction set

Segment

Data element

INPUT

ED-149

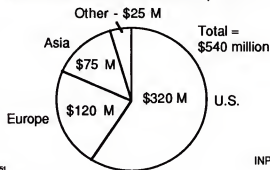
X12 and EDIFACT

- X12 is more widely used
- X12 has more working standards
- EDIFACT is more generic
- Industry and trading partner guidelines are key
- EDIFACT syntax used in X12 committee

INPUT

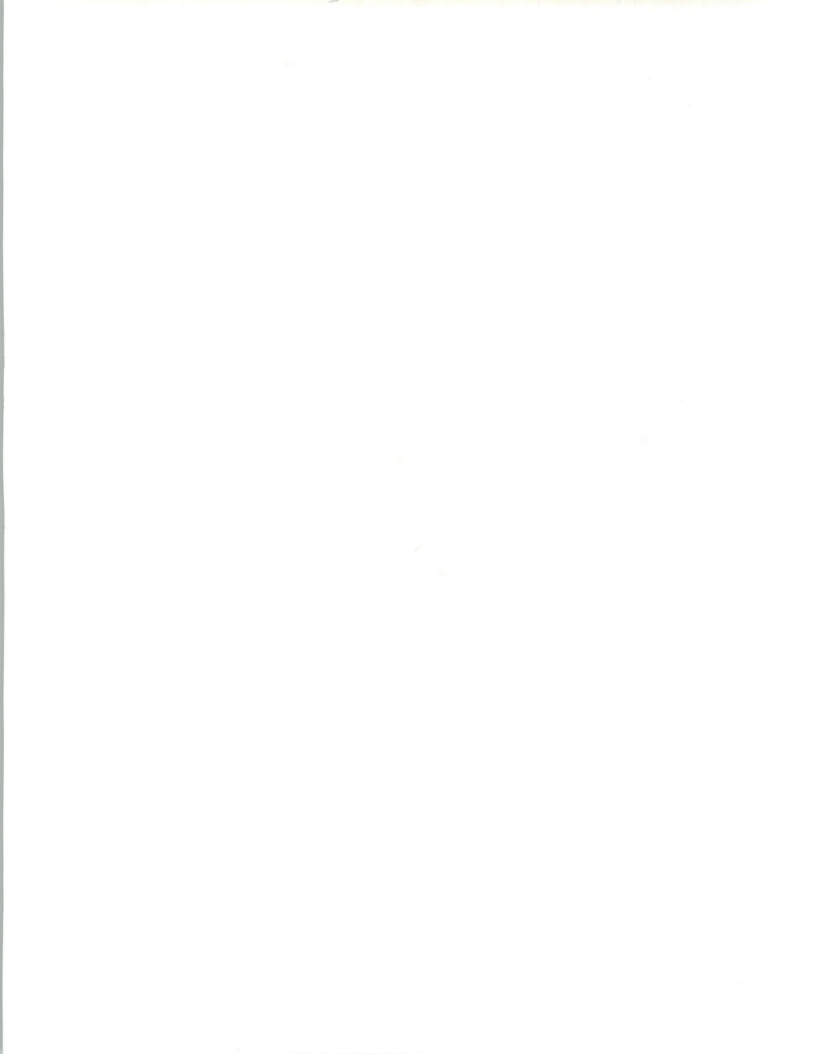
ED-150

Worldwide EDI Market, 1992



INPUT

ED-151



20. VERTICALS (VM)

Vertical Markets

VM-1

INPUT

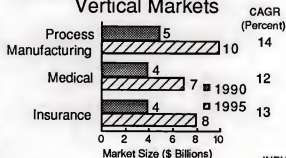
Largest Information Services Vertical Markets



VM-2

INPUT

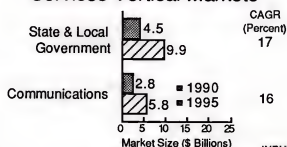
Largest Information Services Vertical Markets



VM-3

INPUT

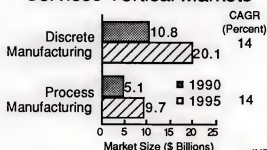
Fast-Growing Information Services Vertical Markets



VM-4a

INPUT

Fast-Growing Information Services Vertical Markets



VM-4b

INPUT

Discrete Manufacturing

VM-5

INPUT

Discrete Manufacturing Market Trends

- Restructuring of CAD/CAM industry
- "One-stop shopping"
- Slow adoption of CIM
- Inroads for EAI
- The constraints of a recession

VM-129

INPUT

Driving for IS Budgets

- Competitive pressures
- New hardware platforms
- From batch to on-line processing
- Integration

VM-130

INPUT

Discrete Manufacturing IS Budget Trends

- Modest, steady increases in budgets
- Software products favored
- Hardware spending constrained
- Major projects continued

VM-131

INPUT

Discrete Manufacturing Major IS Issues

- Lack of corporate information strategy
- Impact of reorganization
- Difficulty of implementing distributed processing
- Control and accountability in decentralized environment

VM-132

INPUT

Discrete Manufacturing New Information Technologies

- Cooperative processing
- Image processing
- Open Systems/UNIX
- CASE

VM-133

INPUT

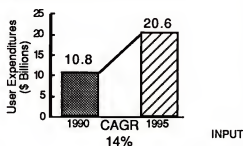
Discrete Manufacturing Growth Inhibitors

- Lack of integrated software
- More committee-based buying decisions
- Unfulfilled IS vendor promises
- More complex requirements
- Too many alternatives

VM-134

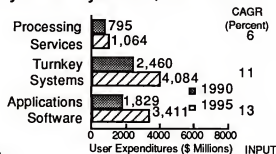
INPUT

Discrete Manufacturing Market, 1990-1995



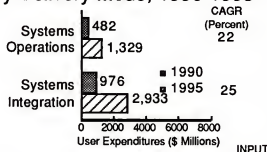
VM-135

Discrete Manufacturing by Delivery Mode, 1990-1995



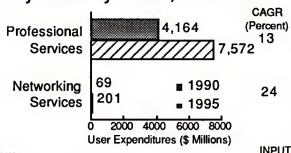
VM-136

Discrete Manufacturing by Delivery Mode, 1990-1995



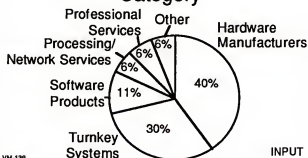
VM-137

Discrete Manufacturing by Delivery Mode, 1990-1995



VM-138

Market Share by IS Vendor Category

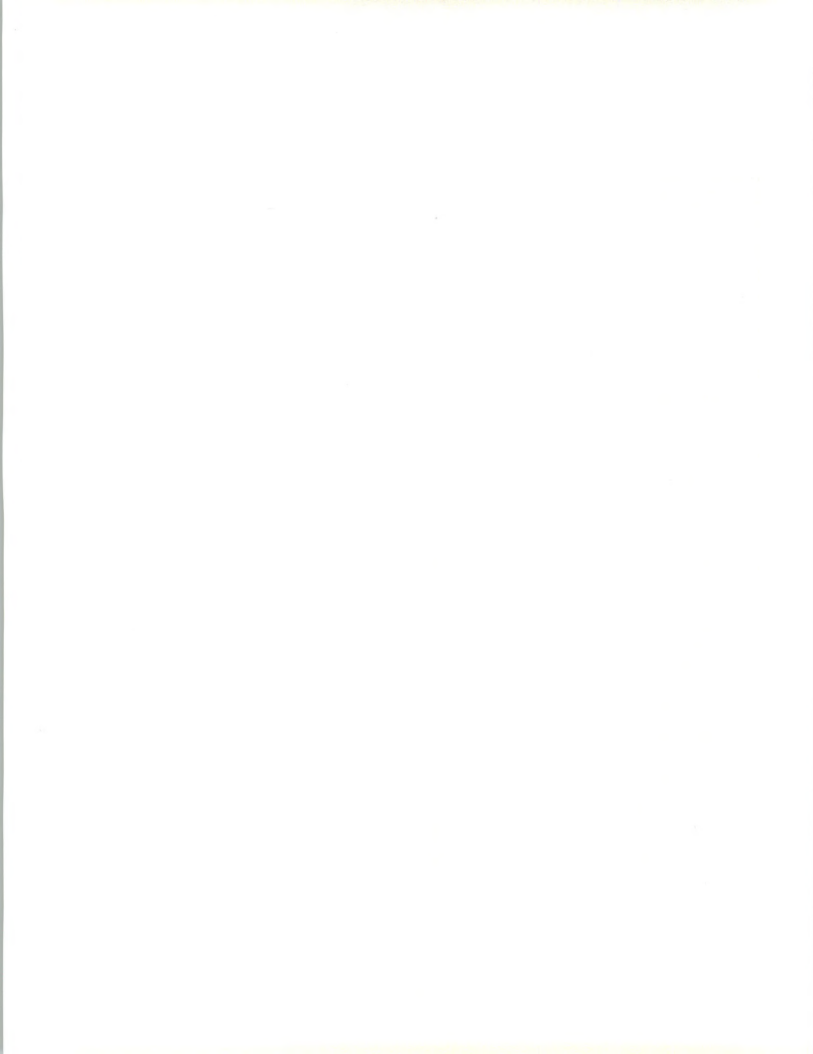


VM-139

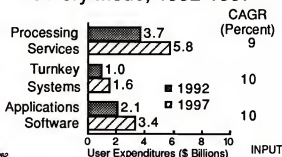
Banking and Finance

INPUT

VM-15

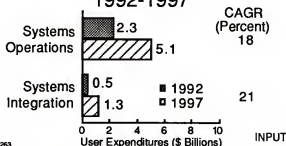


Banking/Finance Market by Delivery Mode, 1992-1997



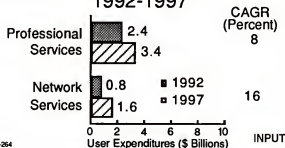
VM-262

Banking and Finance Sector IS Market by Delivery Mode, 1992-1997



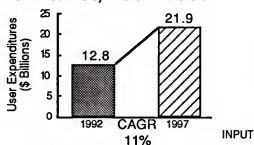
VM-263

Banking and Finance Sector IS Market by Delivery Mode, 1992-1997



VM-264

Banking and Finance Sector IS Market, 1992-1997



VM-265

Banking/Finance Industry Trends—Examples

Extension into Multiple Lines of Business

Products/Services	Offered by:
Checking accounts	Banks
Deposit products	Thrifts
ATM cards	Credit unions

INPUT

VM-18a

Banking/Finance Industry Trends—Examples

Extension into Multiple Lines of Business

Products/Services	Offered by:
Credit cards	Brokers
Loans	Non-bank fin. svcs.
Insurance	Non-bank fin. svcs.

INPUT

VM-18b



Banking/Finance Industry Trends—Examples

Changing Outlook for Individual Products/Services

- Product creation/evolution proceeding at more rapid pace
- 24 hour/automated trading systems
- Increased demand for electronic information services

VM-19

INPUT

Banking/Finance Industry Trends—Vendor Impact

Extension into Multiple Lines of Business

- Good for systems operations, systems integration
- Mixed for software, processing services, turnkey, consulting

VM-20

INPUT

B/F Industry Trends Vendor Recommendations

Products/Services

- Develop modular, data base-oriented systems
- Develop platform-independent open systems

VM-21

INPUT

Banking and Finance Sector 1991/1992 Business Issues

- Recession impacts
- Mergers and acquisitions
- Regulatory concerns
- Profitability pressures on large banks
- Real estate slowdown

VM-266

INPUT

Banking and Finance Sector IS Challenges/Priorities

Segments	Challenges
Banks/Thriffs/ Credit Unions	Cost/benefit pressures Improved systems integration Imaging

VM-267

INPUT

Banking and Finance Sector IS Challenges/Priorities

Segments	Challenges
Brokerage	Trading technology Automated client interfaces Back-office cost control

VM-268

INPUT



State and Local Government

VM-22

INPUT

State and Local Government Major IS Issues

- Budgetary constraints
- Increasing IS solution demand
- Organizational issues
- Personnel availability
- Lack of plans

VM-140

INPUT

State and Local Government New Technology Plans

- 4GL and CASE
- Storage technology (image)
- Networking and connectivity
- Relational data bases
- Distributed processing

VM-141

INPUT

State and Local Government IS Management Objectives

- Upgrade hardware
- Increase software development capabilities

VM-142

INPUT

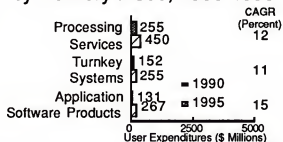
State and Local Government IS Management Objectives

- Increase project management capabilities
- Enhance networks
- Increase strategic planning

VM-143

INPUT

State and Local Government by Delivery Mode, 1990-1995

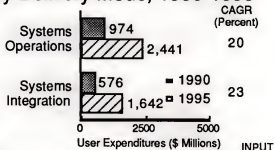


VM-144

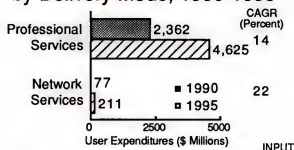
INPUT



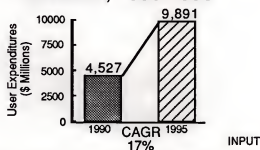
State and Local Government by Delivery Mode, 1990-1995



State and Local Government by Delivery Mode, 1990-1995



State and Local Government IS Market, 1990-1995



Federal Government

Federal Government Economic Events and Trends

- Trade imbalance
 - Economic recession
 - Cold War cessation
 - Domestic problems
 - Middle East crisis
 - Budget deficit
- VM-249 INPUT

Federal Government Technology Trends

- Expanded networks/LANs
 - Improved graphics/imaging
 - Advanced operating systems
 - Artificial intelligence
 - Enhanced microcomputers
 - Advanced communications
- VM-250 INPUT

Federal Government Key Agency Issues

- Planning and management
- Security and privacy
- Resource utilization
- Staff shortages
- Cost containment
- Micromanagement

VM-251

INPUT

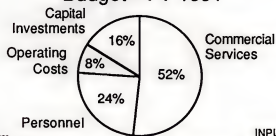
Federal Government Information Services Issues

- Transition from data orientation
- Changing acquisition methods
- Implications of standards
- Shakeout of markets
- Price versus technology

VM-252

INPUT

Federal Government Information Technology Budget—FY 1991



VM-253

INPUT

Applications Downsized to Microcomputers

Application	Rank
Accounting	1
Inventory	2
Financial	3

VM-254

INPUT

Applications Downsized to Microcomputers

Application	Rank
Management systems	4
Data entry	5
Information processing	6

VM-255

INPUT

Federal Government Objectives

- Voice-data integration
- Improved end-user support
- Increased software product applications
- Relational data bases

VM-256

INPUT

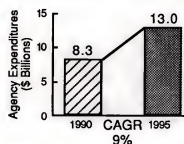
Federal Government Objectives

- Departmental information processing
- Transparent connectivity
- Decision support systems

VM-257

INPUT

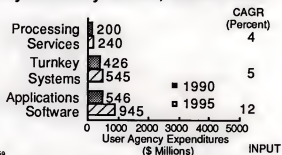
Federal Government IS Market, 1990-1995



VM-258

INPUT

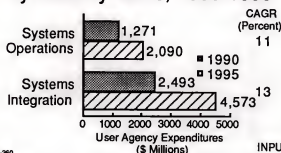
Federal Government IS Market by Delivery Mode, 1990-1995



VM-259

INPUT

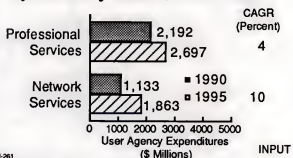
Federal Government IS Market by Delivery Mode, 1990-1995



VM-260

INPUT

Federal Government IS Market by Delivery Mode, 1990-1995



VM-261

INPUT

Medical

VM-37

INPUT

Medical Vendor Opportunities

- Integrated systems
- Clinical/laboratory applications
- Networking: physicians & hospitals
- Professional services

VM-40

INPUT

Medical Vendor Opportunities

- "Point of care" systems
- Skill nursing/health care systems
- Physicians: PC usage
- Prescription drug programs

VM-41

INPUT

Medical—Impacts of Business and Social Trends

- Rising percentage of uninsured
- Urban poverty and service needs
- Growing ranks of elderly
- Drives to control medical costs

VM-148

INPUT

Medical Information Systems: A Changing Role

- Focus on patient-care systems
- Shifting roles for systems in finances
- EDI for ordering and claims
- Issue: Needs versus funds to invest

VM-149

INPUT

Evolving Hospital Systems in the 1990s

- Decentralized departments and applications
- Still-born hospital information systems
- The integration challenge
- From financial to patient-care systems
- The efficiency drive

VM-150

INPUT

Opportunities in Patient-Care Systems

- Electronic charting
- Systems use by medical professionals
- Flexible electronic records access
- Networking multiple systems
- Mixing data, plots, and images

VM-151

INPUT

Hospitals: Business Requirements for IS

- Handle complex billing requirements
 - Government payors
 - Private insurers
 - Electronic billing
- Track HMO/PPO service contracts

VM-152

INPUT

Hospitals: Business Requirements for IS

- Improve clinical efficiency and effectiveness
- Integrate financial and clinical information
- Analyze service profitability
- Support hospital marketing

VM-153

INPUT

Medical—Driving Forces

- Cost accountability
- Reimbursement dynamics
- Patient-care systems
- Documenting outcomes
- Local and community networking
- Systems upgrading and integration
- Experience with outside solutions

VM-154

INPUT

Medical—Inhibiting Factors

- Departmental and old central systems
- Networking obstacles
- Limited in-house experience
- Costly, pioneering new technologies

VM-155

INPUT

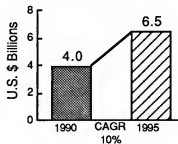
Medical—Inhibiting Factors

- Unproven benefits
- Professional-level resistance
- Expense constraints
- Competing capital investments

VM-156

INPUT

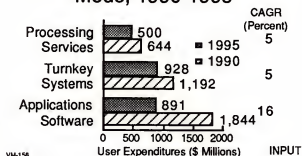
Medical IS Market 1990-1995



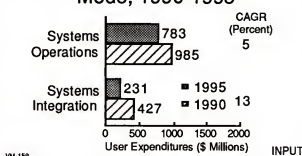
VM-157

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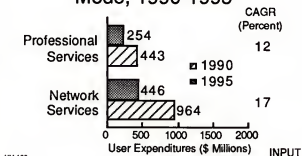
Medical IS Market by Delivery Mode, 1990-1995



Medical IS Market by Delivery Mode, 1990-1995



Medical IS Market by Delivery Mode, 1990-1995



Education

INPUT

VM-42

General Education Industry Trends

- Flat to minimal growth in governmental spending
- Changing demographics of student populations
- Curriculum reform demands

INPUT

VM-161

Education Industry IS Trends

K-12

- Academic Courseware
 - Increased acceptance of CAI
 - Improved quality of CAI courseware
 - Continued limited availability of classroom computers

INPUT

VM-162a

Education Industry IS Trends

- Administrative Applications
 - Teacher/classroom management systems
 - Districtwide record-keeping automation
 - PC-based administrative applications

VM-162b

INPUT

Education Industry IS Trends

Higher Education

- Academic Courseware
 - Slow grow in use of commercial CAI

VM-163a

INPUT

Education Industry IS Trends

Higher Education

- Academic Courseware
 - Expanding CAI development on campus
 - Creation of consortiums to expand CAI use

VM-164b

INPUT

Education Industry IS Trends

Higher Education

- Administrative Applications
 - Expansion of intra/intercampus networks
 - Experimentation with video classroom/offsite instruction

VM-163a

INPUT

Education Industry IS Trends

Academic Libraries

- Expanded use of on-line and CD ROM services
 - Interlibrary E-mail networks in place
 - National library catalog system developing

VM-164a

INPUT

Education Industry IS Trends

Academic Libraries

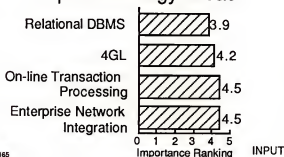
- Expanded use of on-line and CD ROM services
 - Experimentation with text management and retrieval technology

VM-164b

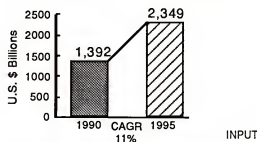
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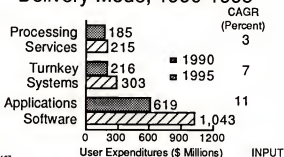
Higher Education Top Technology Areas



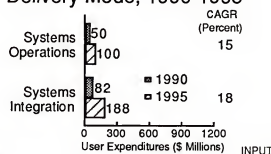
Education IS Market, 1990-1995



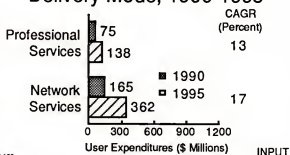
Education IS Market by Delivery Mode, 1990-1995



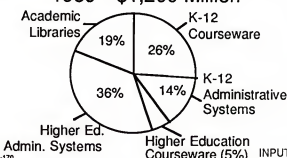
Education IS Market by Delivery Mode, 1990-1995



Education IS Market by Delivery Mode, 1990-1995



Education Market by Segment, 1989—\$1,260 Million



Trends—Higher Education

- Centralized IS control
- Integrated, networked solutions
- Standards for intercampus networking
- Spending on microcomputers in past, leading to connectivity needs

VM-43

INPUT

Trends—Higher Education

- User involvement in software development
- CAI/courseware development
 - EDUCOM
- Budgetary concerns

VM-44

INPUT

Driving Forces Higher Education

- Administrative applications
- Research applications
- Word processing (faculty/students)
- Intracampus networking

VM-45

INPUT

Transportation

INPUT

VM-46

Transportation Critical Future Applications

- On-board computing
- Consolidation center automation tie-in with on-board computing
- Moving operations to relational form
- Expert systems

VM-47

INPUT

Transportation Critical Future Applications

- Systems bridges/interfaces
- Networking integration
- Cost-reducing applications
- Image technology to save resources
- Building networks with customers and suppliers

VM-48

INPUT

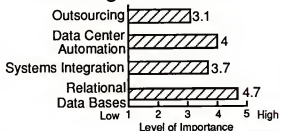
Transportation Critical Future Applications

- Reservation systems
- Revenue enhancement systems
- Hangar operations
- Marketing automation system
- Resource allocation

VM-49

INPUT

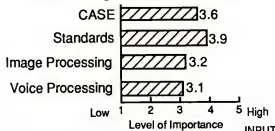
Transportation Ranking of IS Issues



VM-50

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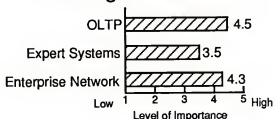
Transportation Ranking of IS Issues



VM-51

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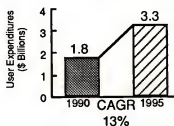
Transportation Ranking of IS Issues



VM-52

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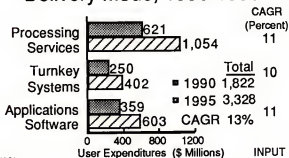
Transportation Market, 1990-1995



VM-53

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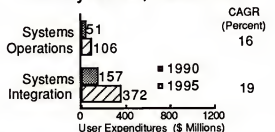
Transportation Market by Delivery Mode, 1990-1995



VM-54

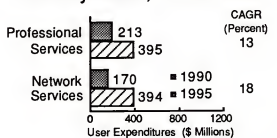
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Transportation Market by Delivery Mode, 1990-1995



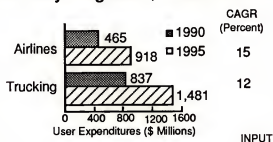
VM-55

Transportation Market by Delivery Mode, 1990-1995



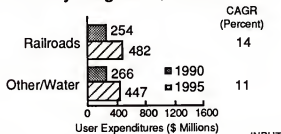
VM-56

Transportation Market by Industry Segment, 1990-1995



VM-57

Transportation Market by Industry Segment, 1990-1995



VM-58

Insurance

VM-59

Insurance Industry Segmentation

- Property and casualty carriers
- Life and health carriers
- Medicare/Medicaid processors
- Independent agents and brokerages

VM-60

The Uncertain Outlook for National Health Insurance

- Rapid rise in uninsured Americans
- The Greying of America
- National health insurance uncertainties

VM-61

INPUT

Insurance Key Business Issues

- Changes in Life products
- Emphasis on customer service
- Periodic budget squeezes
- Foreign sales challenges

VM-62

INPUT

Insurance Key Business Issues

- Rate-setting and regulations
- Tax law changes
- National health insurance?

VM-63

INPUT

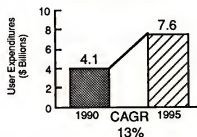
Insurance Sector IS Budget

- Strong central budget control
- Budget range: 3% to 4% of premium revenue
- Annual budget increases average 6%

VM-64

INPUT

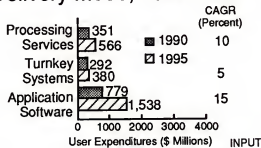
Insurance Market, 1990-1995



VM-65

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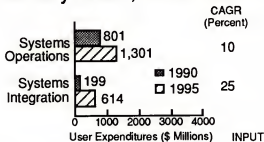
Insurance Market by Delivery Mode, 1990-1995



VM-66

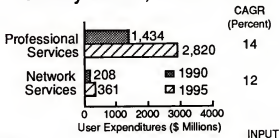
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Insurance Market by Delivery Mode, 1990-1995



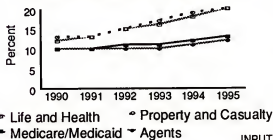
VM-67

Insurance Market by Delivery Mode, 1990-1995



VM-68

Insurance Sector Growth Rate by Segment



VM-69

Insurance Sector Leading Vendors

- Policy Management Systems Corporation
- Equifax
- Electronic Data Systems

VM-70

Insurance Sector Leading Vendors

- The Continuum Company
- Automatic Data Processing
- Agency Management Services

VM-71

Business Services

VM-72



Structure of Business Services Market

SIC Code	Services Category
65	Real Estate
73	Business Services
81	Legal Services

VM-73

INPUT

Structure of Business Services Market

SIC Code	Services Category
87	Engineering, Accounting, Research, Mgmt.
89	Miscellaneous Services

VM-74

INPUT

Business Services Sector Effects of Business Trends

Large Services Firms

- Overall expansion
- Increased competition
- Increased complexity

VM-75

INPUT

Business Services Sector Effects of Business Trends

Small Services Squeeze

- Potential contraction
- Potential for increase in local business
- Specialization

VM-76

INPUT

Business Services Issues Facing IS

- Integration
- Cost containment
- Productivity improvement for professionals

VM-77

INPUT

Business Services Issues Facing IS

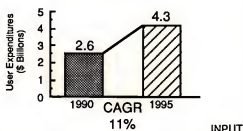
- User friendliness
- Understanding what users really need
- Software flexibility

VM-78

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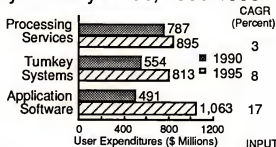
Date	Time	Description
1900	10:00	Left for the field
1900	10:15	Arrived at the field
1900	10:30	Started work
1900	10:45	Continued work
1900	11:00	Finished work
1900	11:15	Left the field
1900	11:30	Arrived at the house
1900	11:45	Dinner
1900	12:00	Rest
1900	12:15	Work
1900	12:30	Continued work
1900	12:45	Finished work
1900	13:00	Left the field
1900	13:15	Arrived at the house
1900	13:30	Dinner
1900	13:45	Rest
1900	14:00	Work
1900	14:15	Continued work
1900	14:30	Finished work
1900	14:45	Left the field
1900	15:00	Arrived at the house
1900	15:15	Dinner

Business Services Market, 1990-1995



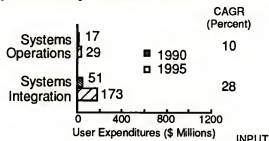
VM-79

Business Services Market by Delivery Mode, 1990-1995



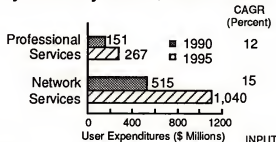
VM-80

Business Services Market by Delivery Mode, 1990-1995



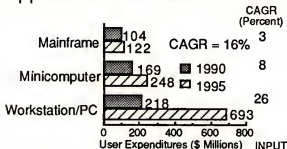
VM-81

Business Services Market by Delivery Mode, 1990-1995



VM-82

Business Services Applications Software Products



VM-83

Accounting

VM-84

INPUT

Accounting Sector—Key Technology Trends

- Downsizing
- Workgroup computing and distributed applications
- RDBMS
- Graphical user interfaces

VM-85

INPUT

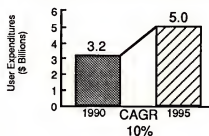
Accounting Sector Key Issues

- Immediate and accurate accounting information
- Need for flexibility and integration
- Support for multinational operations
- Decentralized accounting systems will gain appeal

VM-86

INPUT

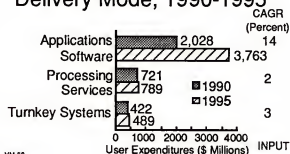
Accounting Cross-Industry Market, 1990-1995



VM-87

INPUT

Accounting Market by Delivery Mode, 1990-1995



VM-88

INPUT

Accounting Sector—Vendor Recommendations

- Expand service offerings
- Flexibility and integration of paramount importance
- Prepare for distributed architecture product offerings

VM-89

INPUT

Education and Training

VM-90

INPUT

Education and Training Sector—Key Technology Trends

- Graphical user interfaces
- Optical storage developments
- Multimedia

VM-91

INPUT

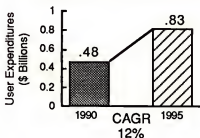
Education and Training Sector—Key Issues

- Broadening training requirements
- Responsibility shifting to corporations
- Interactive training beginning to take hold

VM-92

INPUT

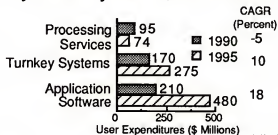
Education and Training Market, 1990-1995



VM-93

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Education and Training Market by Delivery Mode, 1990-1995



VM-94

INPUT

Education and Training Sector User Recommendations

- Ease of use
- Low initial cost
- Emphasize results
- Top-down support

VM-95

INPUT

Education and Training Sector Vendor Recommendations

- Initially a hard sell
- Emphasize simplicity
- Form alliances with computer vendors

VM-96

INPUT

Engineering and Scientific

VM-97

INPUT

Engineering and Scientific Sector—Key Technology Trends

- Shortage of engineers and scientists
- More use of application solutions across functions
- More application specialization/complexity

VM-98

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Engineering and Scientific Sector—Key Issues

- Provision of seamless link between data center and desktop
- Integration of design information into a common data base structure

VM-99

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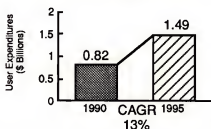
Engineering and Scientific Sector—Key Issues

- Data base management
- Software compatibility and portability

VM-100

INPUT

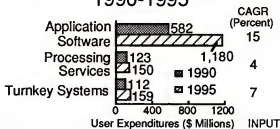
Engineering and Scientific Market, 1990-1995



VM-101

INPUT

Engineering and Scientific Market by Delivery Mode, 1990-1995



VM-102

INPUT

Engineering and Scientific Sector—Vendor Recommendations

- More emphasis on software sales
- Support of standard hardware
- Portable software
- Opportunities in GIS

VM-103

INPUT

Engineering and Scientific Sector—Vendor Recommendations

- Opportunities in systems integration
- Opportunities for increased processing services in selected industries
- Name recognition becoming more important

VM-104

INPUT

Human Resources

VM-105

INPUT

Human Resources Sector Key Technology Trends

- RDBMS and distributed processing
- Client/server architecture
- PC front-ends
- Executive information systems

VM-106

INPUT

Human Resources Sector Key Issues

- Keeping up with change
- More power to the employee
- Attracting and retaining highly skilled people

VM-107

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Human Resources Sector Key Issues

- Flexible benefits
- Provision of training and tracking of skill
- Shared HR function with line managers

VM-108

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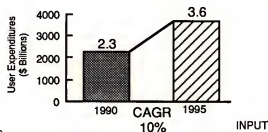
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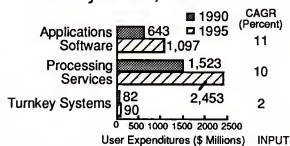
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Human Resources Market, 1990-1995



VM-109

Human Resources Market by Delivery Mode, 1990-1995



VM-110

Human Resources Sector Vendor Recommendations

- New technology-based solutions
- Competition heating up at midrange and PC level
- Multinational system

VM-111

Human Resources Sector Vendor Recommendations

- Integration
- Processing services enhancements
- Continual upgrades
- Small business market

VM-112

Office Systems

VM-113

Office Systems Sector Key Technology Trends

- More powerful desktop computing
- Widespread use of LANs
- Standard user interfaces

VM-114

Office Systems Sector Key Issues

- Evolving definition of white collar worker
- Evolving definition of office

VM-115

INPUT

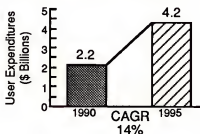
Office Systems Sector Key Issues

- Increasing requirement for adaptability
- Increasing need to improve office worker productivity

VM-116

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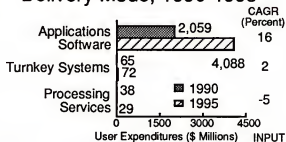
Office Systems Cross-Industry Market, 1990-1995



VM-117

INPUT

Office Systems Market by Delivery Mode, 1990-1995



VM-118

INPUT

Office Systems Sector Vendor Recommendations IOS

- Ensure minicomputer's proper place
- Develop differentiation strategy
- Multiplatform strategy
- Unbundle software

VM-119

INPUT

Office Systems Sector Vendor Recommendations

IOS

- Emphasize integration with line of business software
- Emphasize effective hardware utilization
- Client-server questions

VM-120

INPUT



Office Systems Sector Vendor Recommendations

Word Processing

- One product vs. a multiple product strategy
- Emphasize multiplatform strategy, including UNIX

VM-121

INPUT

Office Systems Sector Vendor Recommendations

DTP

- Pursue international opportunities
- Diversify—scanning? imaging?

VM-122

INPUT

Planning and Analysis

VM-123

INPUT

Planning and Analysis Sector Key Technology Trends

- Electronic media/data bases
- RDBMS evolution
- Graphical user interfaces

VM-124

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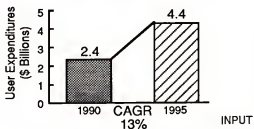
Planning and Analysis Sector—Key Issues

- Constantly changing conditions
- Time-critical management information needs

VM-125

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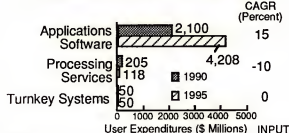
Planning and Analysis Market, 1990-1995



VM-126

INPUT

Planning and Analysis by Delivery Mode, 1990-1995



Planning and Analysis Sector Vendor Recommendations

- Broad product functionality
- Multipronged sales strategy
- More diverse user base

INPUT

VM-128

Process Manufacturing

INPUT

VM-171

Process Manufacturing Trends in Information Services

- Globalized data management
- Emphasis on plant optimization
- Decentralization of plant management
- Continued need for customization

INPUT

VM-172

Process Manufacturing Trends in Information Services

- Total solutions for process manufacturing
- Systems integrators targeting process manufacturing
- Customized CIM solutions offered

INPUT

VM-173

Process Manufacturing Major Issues in IS

- Impact of restructuring on IS strategy
- Magnitude of flux (mergers, acquisitions, restructuring)
- Integration of disparate levels of information systems

INPUT

VM-174



Process Manufacturing Major Issues in IS

- Lack of available application software products and turnkey systems
- Uniqueness of subindustries

VM-175

INPUT

Process Manufacturing Driving Forces

- Large size of information systems projects
- Integration requirements
- Relative strength of U.S. process manufacturing companies

VM-176

INPUT

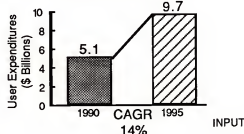
Process Manufacturing Growth Inhibitors

- Uniqueness of subindustries
- Fragmentation of existing information systems
- Decentralization of IS expenditure control

VM-177

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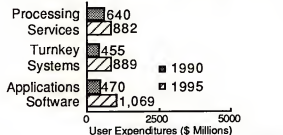
Process Manufacturing Market Information Services 1990-1995



VM-178

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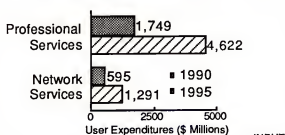
Process Manufacturing Market by Delivery Mode, 1990-1995



VM-179

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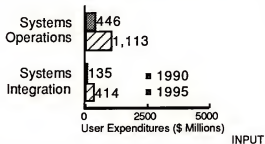
Process Manufacturing Market by Delivery Mode, 1990-1995



VM-180

INPUT

Process Manufacturing Market by Delivery Mode, 1990-1995



VM-181

Process Manufacturing Recommendations for IS Vendors

- Relationships with customers—source of new applications
- Professional services support— independently or through alliance

INPUT

VM-182

Process Manufacturing Recommendations for IS Vendors

- Alliances with digital control systems vendors
- Plant information management application products

INPUT

VM-183

Process Manufacturing Recommendations for IS Vendors

- Focus on niche segments
- Support compound document capabilities

INPUT

VM-184

Process Manufacturing Recommendations for IS Vendors

- Customization through programming interface tools
- Develop alliances

INPUT

VM-185

Process Manufacturing Recommendations for IS Vendors

- Alliances with sales industry specialists
- Support network integration and interoperability

INPUT

VM-186

Utilities

VM-187

INPUT

Utilities Information Systems Issues

- Data integrity
- IS as an investment versus an expense
- Corporate systems

VM-188

INPUT

Utilities Information Systems Objectives

- Be the solution to, not the victim of, downsizing
- Gain attention/respect of top management

VM-189

INPUT

Utilities Information Systems Objectives

- Fulfill corporate role while controlling end users
- Expand information systems to engineering/operations

VM-190

INPUT

Utilities Driving Forces

- Regulation
 - Federal deregulation
 - State reregulation
- Competition
 - Marketing
 - Open access

VM-191

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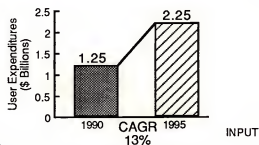
Utilities Driving Forces

- Costs
 - Plant operations
 - Asset management

VM-192

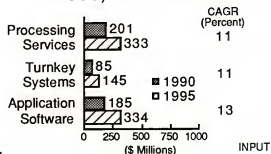
INPUT

Utilities Market, 1990-1995



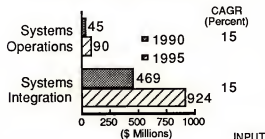
VM-193

Utilities IS Market by Delivery Mode, 1990-1995



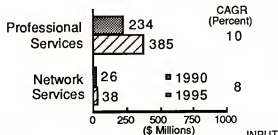
VM-194

Utilities IS Market by Delivery Mode, 1990-1995



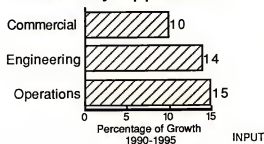
VM-195

Utilities IS Market by Delivery Mode, 1990-1995



VM-196

Utilities IS Market Growth by Application



VM-197

Telecommunications

VM-198

Telecommunications Key Industry Issues

- Regulatory constraints
- LATA boundaries
- Service pricing
- Customer understanding
- Trade and competition

VM-199

INPUT

Telecommunications Key Business Trends

- Continued regulatory constraint
- Increasing rate reduction pressure
- Mergers and acquisitions
- Foreign investment
- Regulated/nonregulated business balance

VM-200

INPUT

Telecommunications Key Technology Trends

- Higher bandwidth
- ISDN services
- Information services
- Mobile communications

VM-201

INPUT

Telecommunications Key Technology Trends

- Network management
- Cable services
- VSAT services

VM-202

INPUT

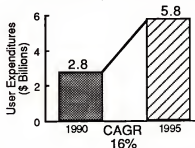
Telecommunications Information Systems Objectives

- Improve staff productivity
- Integrate operations systems
- Decentralize/distribute systems
- Flexible billing
- Tactical planning

VM-203

INPUT

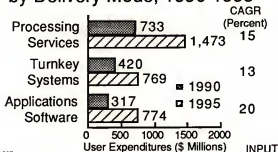
Telecommunications IS Market, 1990-1995



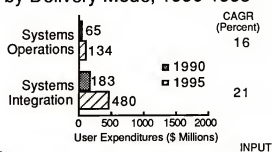
VM-204

INPUT

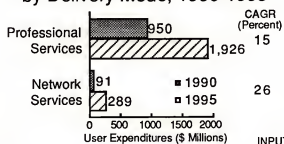
Telecommunications Market by Delivery Mode, 1990-1995



Telecommunications Market by Delivery Mode, 1990-1995



Telecommunications IS Market by Delivery Mode, 1990-1995



Telecommunications Driving Forces

- Deregulation
 - Service/organization integration
 - Flexible software
 - Staff productivity
 - Internal system support
- INPUT
- VM-208

Telecommunications Inhibiting Factors

- Regulatory constraints
 - Unqualified customer needs
 - Unresolved standards
 - Continuing public pressure
- INPUT
- VM-209

Telecommunications Vendor Recommendations

- Focus on integration
 - Understand the carrier's customer
 - Emphasize carrier-to-customer linkages
- INPUT
- VM-210

Telecommunications Vendor Recommendations

- Flexible software is key
- Network management tools needed
- Understand the regulations

VM-211

INPUT

Wholesale Distribution

INPUT

VM-212

Wholesale Distribution Key Business Trends

- Increased service orientation
- Improved quality
- Economic slowdown
- Financing problems
- Rising transportation and other costs

VM-213

INPUT

Wholesale Distribution Key Business Trends

- Consolidation
- Globalization
- Systemization of business functions
- Restructuring of wholesale channels

VM-214

INPUT

Wholesale Distribution Key Technology Trends

- Network use
- On-line transaction processing
- Use of electronic information
- PC LAN use
- RDBMS
- Automation of warehouses

VM-215

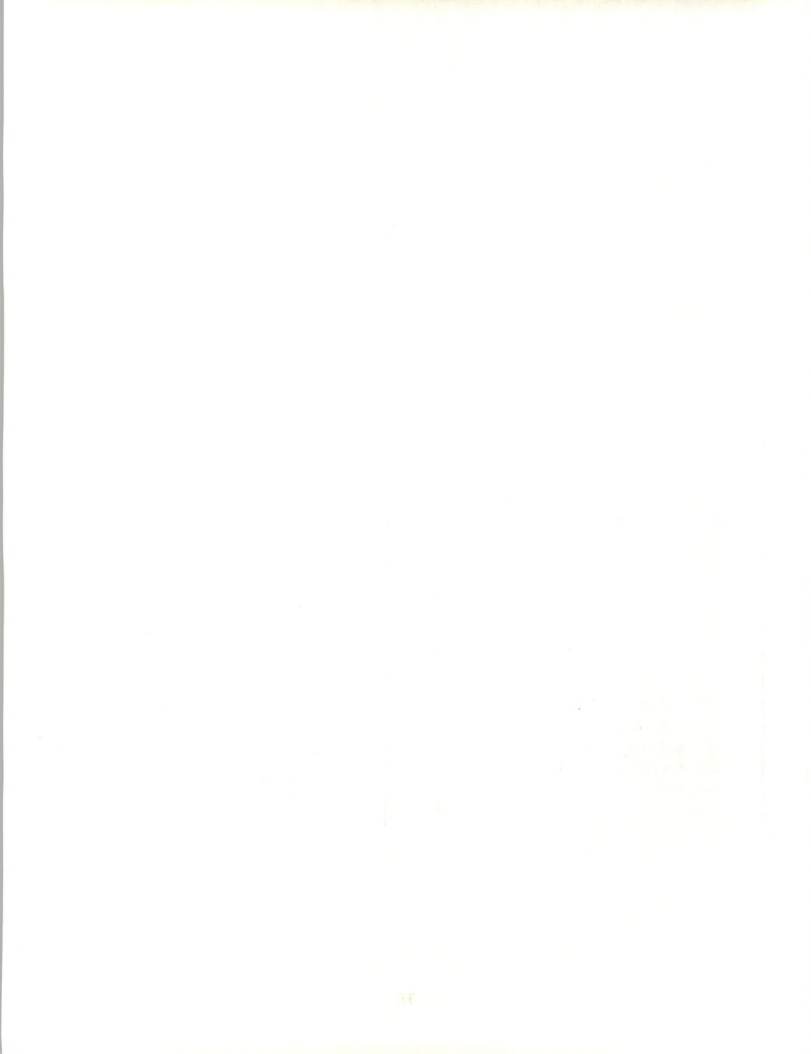
INPUT

Key Issues of Large Wholesalers

- Improving quality of service
- Consolidating business units
- Discounting prices
- Pressure on margins
- Cost management

VM-216

INPUT



Key Issues of Midsized Wholesalers

- Cost containment/reduction
- Improving quality of service
- Consolidating business
- Pressure on margins
- Price competition

VM-217

INPUT

Key Issues of Small Wholesalers

- Cost reduction
- Pressure on margins
- Improving service
- Funding business improvement

VM-218

INPUT

Wholesale Distribution Key Business Issues Confronting I.S.

- IS contribution to quality
- Tight and contracting budgets
- Emphasis on customer services
- Consolidation of IS functions
- Network planning

VM-219

INPUT

Wholesale Distribution Key Future Technologies

- EDI
- CASE
- Expert systems
- Image processing
- ISDN
- CD ROM

VM-220

INPUT

Wholesale Distribution Driving Forces

- Improvement of order processing
- On-time delivery
- Pre-sales and post-sales service
- Access to product and customer information

VM-221

INPUT

Wholesale Distribution Driving Forces

- Network upgrading/integration
- Linkage to clients and suppliers
- Consolidation/integration of application
- Improvement in inventory and warehouse functions

VM-222

INPUT

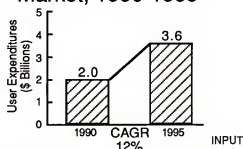
Wholesale Distribution Inhibiting Factors

- Economic downturn
- Tight margins
- Lack of funding
- Uncertain business plans
- Technology presently in use

VM-223

INPUT

Wholesale Distribution Market, 1990-1995



VM-224

INPUT

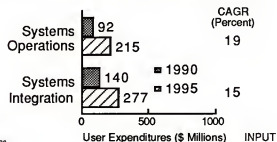
Wholesale Distribution Market by Delivery Mode 1990-1995



VM-225

User Expenditures (\$ Millions) INPUT

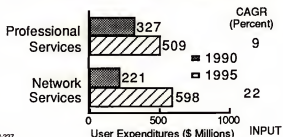
Wholesale Distribution Market by Delivery Mode 1990-1995



VM-226

User Expenditures (\$ Millions) INPUT

Wholesale Distribution Market by Delivery Mode 1990-1995



VM-227

User Expenditures (\$ Millions) INPUT

Retail Distribution

VM-228

INPUT

Retail Distribution Key Business Trends

- Economic slowdown
- Financing problems
- Rising costs
- Consolidation
- Increased service orientation

VM-229

INPUT

Retail Distribution Key Business Trends

- Heightened competitiveness
- Trend to specialty stores
- Use of data to target opportunities
- Globalization

VM-230

INPUT

Retail Distribution Key Technology Trends

- Card transactions
- PC-based POS
- Use of POS data
- Automated sales analysis
- EDI

VM-231

INPUT

Retail Distribution Key Technology Trends

- Merchandising systems
- Electronic marketing
- Outsourcing
- Use of technology to combat shrinkage
- Inventory automation

VM-232

INPUT

Retail Distribution Priority Application Areas

- POS
- Sales and customer buying analysis
- Merchandise management
- EDI

VM-233

INPUT

Retail Distribution Priority Application Areas

- Inventory control
- Executive information systems
- Purchasing

VM-234

INPUT

Retail Distribution—Outlook for Selected Technologies

- EDI
- CASE
- CD ROM
- Bar Code

VM-235

INPUT

Retail Distribution—Outlook for Selected Technologies

- Expert Systems
- Image Processing
- ISDN

VM-236

INPUT

Retail Distribution IS Budgets

- Strong central budget control is common
- Budget range: 0.8 - 1.8% of revenue
- Annual budget increases average 3%

VM-237

INPUT

Retail Distribution Driving Forces

- Cost reduction
- Increased revenue on goods stocked
- Increased collection and analysis of sales data
- Consolidation

VM-238

INPUT

Retail Distribution Driving Forces

- Integrated applications
- Use of RDBMS
- Improved use of IS
- Network upgrading/integration

VM-239

INPUT

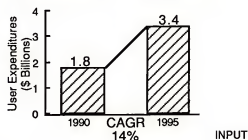
Retail Distribution Inhibiting Factors

- Economic downturn
- Falling margins
- Lack of funding
- Uncertain business plans
- Shortages of IS technical skills
- Technology presently in use

VM-240

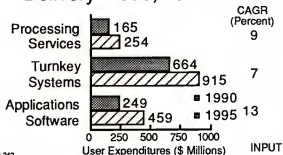
INPUT

Retail Distribution IS Market, 1990-1995



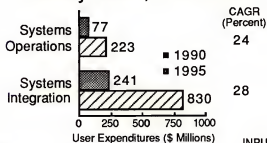
VM-241

Retail Distribution Market by Delivery Mode, 1990-1995



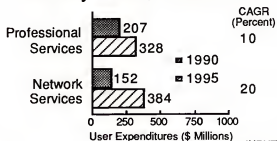
VM-242

Retail Distribution Market by Delivery Mode, 1990-1995



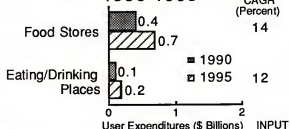
VM-243

Retail Distribution Market by Delivery Mode, 1990-1995



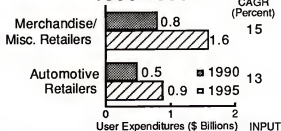
VM-244

Retail Distribution—User Expenditures by Segment 1990-1995



VM-245

Retail Distribution—User Expenditures by Segment 1990-1995



VM-246

Leading Vendors Retail Distribution

- Reynolds and Reynolds
- ADP
- NCR
- EDS
- IBM
- National Data Corporation

INPUT

VM-247

Retail Distribution Key Technological Challenges for Users

- Upgrading POS systems
- Collecting sales data
- Upgrading older technology
- Implementing EDI
- Upgrading network capabilities

INPUT

VM-248



Federal Government Economic Events and Trends

- Trade imbalance
- Economic recession
- Cold War cessation
- Domestic problems
- Middle East crisis
- Budget deficit

INPUT

VM 249

Federal Government Technology Trends

- Expanded networks/LANs
- Improved graphics/imaging
- Advanced operating systems
- Artificial intelligence
- Enhanced microcomputers
- Advanced communications

INPUT

VM 250

Federal Government Key Agency Issues

- Planning and management
- Security and privacy
- Resource utilization
- Staff shortages
- Cost containment
- Micromanagement

INPUT

VM 251

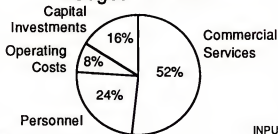
Federal Government Information Services Issues

- Transition from data orientation
- Changing acquisition methods
- Implications of standards
- Shakeout of markets
- Price versus technology

INPUT

VM 252

Federal Government Information Technology Budget—FY 1991



INPUT

VM 253

Applications Downsized to Microcomputers

Application	Rank
Accounting	1
Inventory	2
Financial	3

INPUT

VM 254



Applications Downsized to Microcomputers

Application	Rank
Management systems	4
Data entry	5
Information processing	6

INPUT

VM-255

Federal Government Objectives

- Voice-data integration
- Improved end-user support
- Increased software product applications
- Relational data bases

INPUT

VM-256

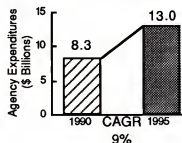
Federal Government Objectives

- Departmental information processing
- Transparent connectivity
- Decision support systems

INPUT

VM-257

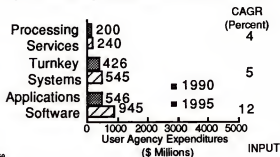
Federal Government IS Market, 1990-1995



INPUT

VM-258

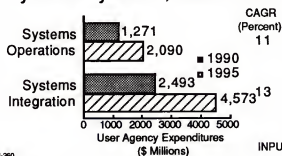
Federal Government IS Market by Delivery Mode, 1990-1995



INPUT

VM-259

Federal Government IS Market by Delivery Mode, 1990-1995

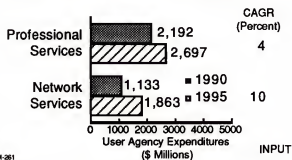


INPUT

VM-260



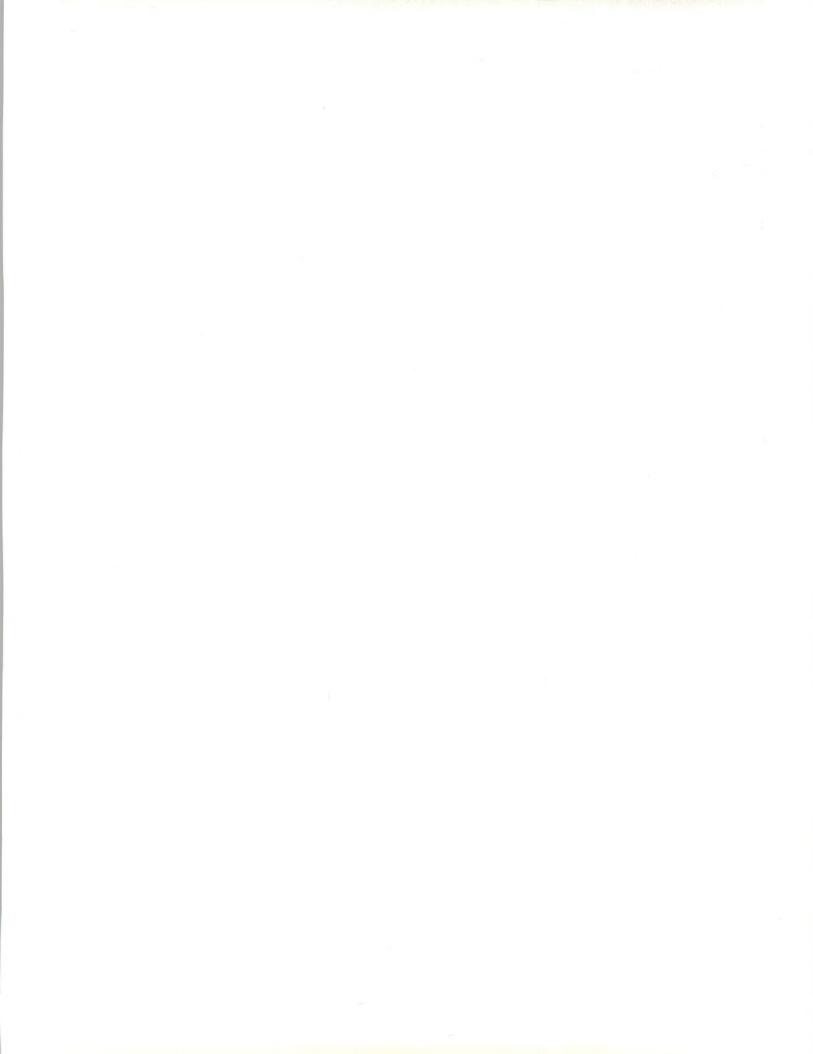
Federal Government IS Market by Delivery Mode, 1990-1995

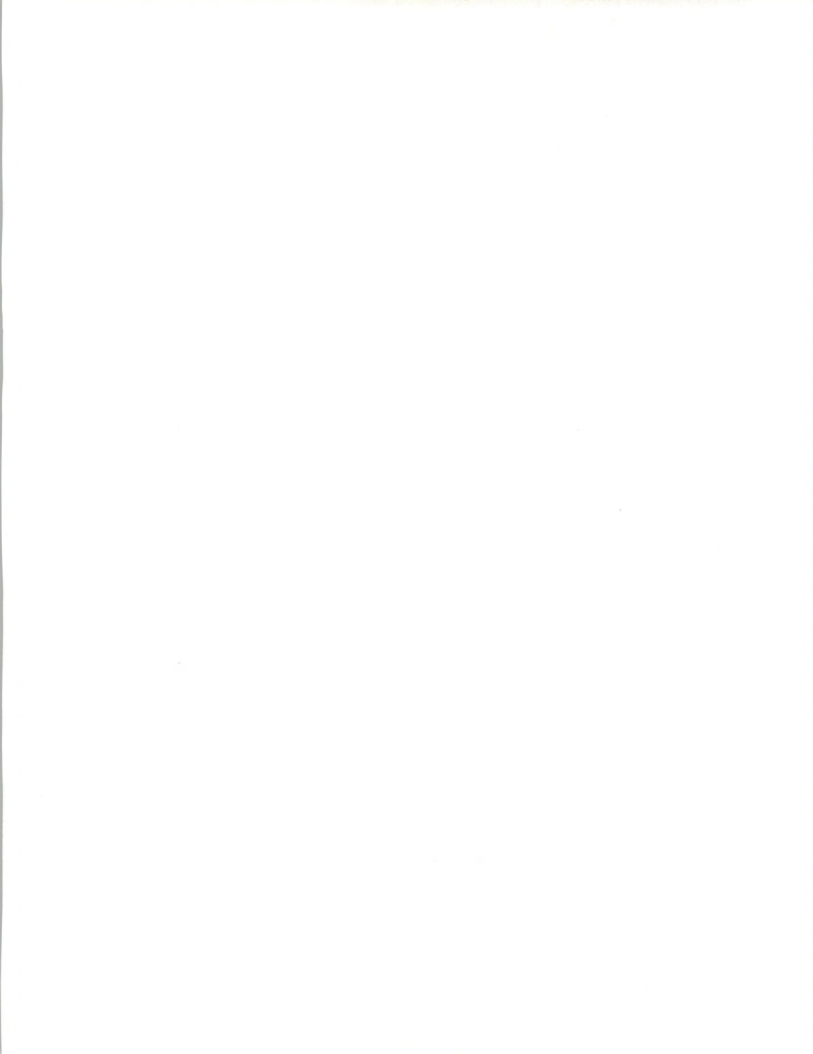


Medical

INPUT

VM-37





22. Competition
(CO)

Competitive Trends

CO-1

INPUT

Vendor Activities Demonstrate 1990s Trends

- Andersen Consulting
- Computer Associates
- Computer Sciences
- Electronic Data Systems

CO-2

INPUT

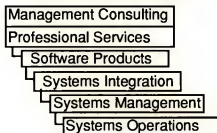
Vendor Activities Demonstrate 1990s Trends

- Microsoft
- Oracle
- Digital Equipment
- IBM
- Japanese vendors

CO-3

INPUT

Andersen Consulting Services Evolution



CO-4

INPUT

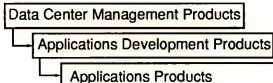
Computer Associates

- Largest software product vendor
- Consolidation in systems software products
- Strategy—growth by acquisition
- Developing architecture
- Porting products to DEC and others
- Establishing alliances
- Emphasize continuing revenue streams

CO-5

INPUT

Computer Associates



CO-6

INPUT

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS
54 EAST LAKE STREET
CHICAGO, ILLINOIS 60601-1426
U.S.A.

THE UNIVERSITY OF CHICAGO PRESS

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Computer Associates

- Resources allocated to
 - Future integration plans
 - Customer support for current products

CO-7

INPUT

Computer Sciences Corp

- Continues strong in federal markets
 - Primarily professional services/SI
- Resurgent interest in commercial markets
 - Health and insurance
 - Tax and credit
 - Professional services/SI

CO-8

INPUT

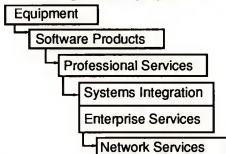
Computer Sciences Corp

- Acquisitions key to commercial activities
 - Index
 - Computer Partners

CO-9

INPUT

Digital Equipment



CO-11

INPUT

EDS

- Industry leader in systems operations
- Aiming for very large accounts
- Industry-oriented
 - Finance
 - Insurance
 - State and local government
 - Banking

CO-12

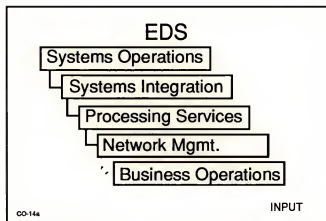
INPUT

EDS

- Broad range of systems: IBM, DEC, HP
- Ownership position in HDS
- Strong network capability
- Global

CO-13

INPUT



**EDS Services Profile
1989 Revenue Distribution**

	Distribution (%)
Systems management	78
Systems integration	11
Development	9
Consultative	2

INPUT

CO-14b

- IBM Services
Commercial Evolution**
- Application software division
 - IBM Network
 - Systems integration division
 - Applications solutions line of business
 - Information systems services division
 - Consulting practices and operations
- INPUT
- CO-15

- IBM**
- Fundamental changes
1. Sales incentives for services
 2. Willingness to provide systems operations services
- INPUT
- CO-16

- IBM National Services
Division**
- Will provide systems operations for customers
 - 30,000 people
 - Works with IBM's SID and INS operations
- INPUT
- CO-17

- IBM National
Services Division**
- Provides all "operations support" functions
 - Data center design and building
 - Remote, "Lights-out" data center operations
 - HW/SW/network maintenance
- INPUT
- CO-18a

the 1980s, the number of people in the world who are illiterate has increased from 400 million to 600 million.

The World Bank estimates that the number of illiterate people in the world will reach 700 million by the year 2000. This is a staggering figure, and it is a clear indication that the world is not doing enough to combat illiteracy.

One of the main reasons for the increase in illiteracy is the lack of access to education. In many developing countries, there are no schools or the schools are of very poor quality. This means that many children are unable to attend school and become illiterate.

Another reason for the increase in illiteracy is the lack of resources. In many developing countries, there are no books or other educational materials available. This means that even if there are schools, the quality of education is very poor.

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IBM National Services Division

- Provides all "operations support" functions
 - Disaster recovery
 - End-user software support
 - Systems operations studies
 - Conversion services

CO-18b

INPUT

IBM Investments in Software/Services Firms

- Worldwide scope
 - 19 in U.S.
 - 24 in Europe
 - 20 in Far East
- Leverage for IBM greater than percent of equity indicates

CO-19

INPUT

IBM Investments in Software/Services Firms

- Investments will continue
- Pressure on other equipment manufacturers
- Pressure on software vendors by-passed by IBM

CO-20

INPUT

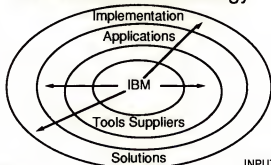
IBM Investments in Software/Services Firms

- Enhances SAA as de-facto standard
- Ensures continuing flow of new SAA-compliant applications
- Dilutes impact of UNIX, other industry standards on IBM's heartland

CO-21

INPUT

IBM Investment Strategy



CO-22

INPUT

IBM Partners in Professional Services

Company	Activity
CTG	AD/Cycle
CAP Gemini America	AD/Cycle
G.E. Consulting	AD/Cycle
Computer Power Group	AD/Cycle
AMS	Marketing

CO-23

INPUT

1992-1993

1992-1993

1992-1993

1992-1993

1992-1993

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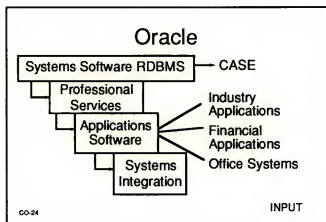
1992-1993

1992-1993

1992-1993

1992-1993

1992-1993



Aerospace Subsidiaries

- Tried the "Computer Utility" route
- Have enjoyed limited success

CO-25a INPUT

Aerospace Subsidiaries

Successes

1. Government
 - BCS
 - Grumman
 - MMDS
2. Specialized areas
 - TRW

CO-25b INPUT

Aerospace Companies

- Litton Computer Services
- Provides "computer utility" processing services
 - \$30M revenues
 - "Packaged" pricing
 - Emphasis in Los Angeles

CO-26 INPUT

European Companies

- CAP Gemini Sogetti (CAP-SESA) is parent of CAP GEMINI AMERICA (CGA)
 - Close to \$1 billion in 1989
 - Focus on professional services

CO-27a INPUT

European Companies

- Aggressive acquirer
- Will not attack operations market directly
 - Provide support services
 - Emphasizes development market

CO-27b INPUT



European Companies

- Hoskyns:
 - Very successful in FM
 - Good "computer utility" model
 - Avoided industry specialization

CO-28a

INPUT

European Companies

- Thorn-EMI
 - Also successful in processing utility
- SD-Scicon, GSI, Sema-Cap, others
- PTTs becoming more aggressive

CO-28b

INPUT

Japanese Vendors

- Large companies already exist
- Close scrutiny of U.S., European markets
- Cautious approach to investment

CO-29a

INPUT

Japanese Vendors

- Alliances likely to come first
- Entering markets with Japanese clients
- Usually part of corporate family
- Attacking secondary markets

CO-29b

INPUT

Japanese Companies

- NT&T Data Services
 - Primary market government
 - SI/Systems operations
- Many VAN companies (500)

CO-30

INPUT

Summing It Up

- Broadening product strategies
- Emphasis on "solution" niches
- Focus on quality and service
- Accomplished through:*
 - Self-funded expansion
 - Consolidation—partnering/acquisitions

CO-31

INPUT



IBM—Market Perceptions

- Inertia—tradition/size
- Product vs. services orientation
- False starts in solution selling
- Organizational positioning
- Lack of vertical focus—business solutions
- Aversion to risk

CO-32

INPUT

IBM—The Positive Points

- A revenue leader in every market
- Immense resources
 - Human
 - Financial
- Worldwide geographic coverage
- Reputation for quality

CO-33

INPUT

IBM—Recommendations

- Organize for rapid response
- Position as a solution provider
- Refine the art of the deal
- Target the market
 - Cross-industry
 - Vertical

CO-34

INPUT

Vendor Direction

CO-35

INPUT

Vendor Direction—EDS

- Services based on technology and execution
 - Systems operations
 - Systems integration
 - Business operation
- Vertical focus—large companies

CO-36

INPUT

Vendor Directions Computer Associates

- Slowdown in acquisitions
- CA90s—framework for development
- Major emphasis on UNIX

CO-37

INPUT

Vendor Directions Microsoft

- Windows vs. OS/2
- Attention to UNIX
- Alliances beyond IBM
- Focus on LANs
- Professional services offerings

CO-38

INPUT

Vendor Directions Andersen Consulting

- Services based on technology
 - Systems integration
 - Application management
 - Systems operations
- Software focus—CASE plus applications

CO-39

INPUT

Competition

CO-40

INPUT

EDS

- Industry leader
- Full range of information services
- Shared resources SO focus
- Vertical industry organization
- Aggressive growth strategy
- Leverage GM experience/resources

CO-41

INPUT

IBM

Software Products ASD

Processing Services IIN

Systems Integration FSD
SID

Applications Solutions AS

Systems Operations SSD
IIN

INPUT

CO-42

Andersen Consulting

Management Consulting
Software Development

Software Products • MAC PAC
• FOUNDATION
• DCS

Systems Integration

Systems Operations • Infont
• Sun Oil

INPUT

CO-43

Systematics

- Finance industry specialist
- Integrated financial software
- Primarily dedicated equipment near client site
- Focus on medium and small banks

CO-44

INPUT

The New IBM

CO-45

INPUT

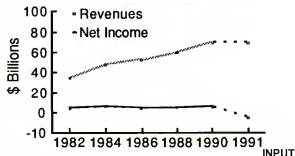
The New IBM

- Performance
- What is different?
- What may follow?

CO-46

INPUT

IBM Financial Performance



CO-47

INPUT

IBM Performance

Category	5-Yr. Growth Rate (%)
Processors	6
PCs/Workstations	25
Peripherals	5
Software	16
Services	12

CO-48

INPUT

IBM Performance

What used to work
doesn't work now

CO-49

INPUT

IBM Performance Strategies No Longer Work

- Wait-and-see strategy
 - 4-year plus cycles
 - Enter established markets
- Average technology—high price

CO-50

INPUT

IBM Performance Strategies No Longer Work

- Conflicting proprietary products
 - Too many—10,000
- Overpower with service
 - On-site intelligence
- Favoring the whole versus the parts

CO-51

INPUT

The New IBM—Leveraging Underutilized Assets

- Underlying technology
- Manufacturing strengths
- Financial strengths
- Pure research

CO-52

INPUT

The New IBM—Organizational Experimentation

- Minority investments
- Multiple reorganizations
- Re-enter processing/network services market
- Original PC launch
- Systems integration division

CO-53

INPUT

The New IBM The Restructure

- New business units
- 10% fewer employees
- More organizational complication
- Beginning decentralization of control
- Promise of more change

CO-54

INPUT

The New IBM More Business Units

- Storage products business
- Pennant Systems Company (printer products)
- Further separation of PC business
- ISSC Division
- ???

CO-55

INPUT



The New IBM Organizational Complication

- Increased internal competition
 - Sales
 - Products
 - Services

CO-56

INPUT

The New IBM Organizational Complication

- Increased pressure on the customer
 - Product conflicts
 - Increased choices
 - Decreased support
- More minority investments

CO-57

INPUT

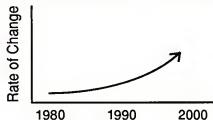
The New IBM Decentralization of Control

- Investment authority
- Sales organization measurement
 - Profits versus units
- Smaller central staffs
- Promise of more change

CO-58

INPUT

The New IBM Evolution versus Revolution



CO-59

INPUT

The New IBM What May Follow?

- SAA includes non-proprietary technologies
- Competing sales forces
 - Captive to IBM
 - Noncaptive—VARs and OEMs

CO-60

INPUT

The New IBM What May Follow?

- Competing technologies
 - OS/2 and UNIX
 - AS/400 and RISC
 - Client/server at all levels
- Even less service and support

CO-61

INPUT



The New IBM What May Follow?

- Licensing of Technology
 - Apple—future UNIX operating system
 - Siemens—chip technology
 - Bull—processor technology
 - Wang—applications software

CO-62

INPUT

The New IBM Where IBM Can Grow

	Rev. (\$B)	Market (\$B)	Share (%)
Mainframes	12.0	20	60
Minicomputers	3.5	25	<15
PCs	14.0	50	25
Software	10.0	60	15
Services	5.0	60	<10

CO-63

INPUT

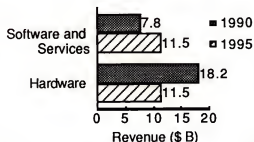
The New IBM Success Indicators

- Sale of technology to vendors
- Learning to compete with itself
- Success in selling to end user
- Success managing business units

CO-64

INPUT

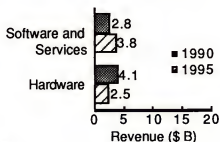
IBM—Europe



CO-65

INPUT

DEC—Europe



CO-66

INPUT

IBM in 2001

- Directly competing sales forces
- Directly competing divisions
- Directly competing technology
- Significant revenue from other vendors
- Less revenue growth, more income growth

CO-67

INPUT

IBM in 2001

More Than 1
Company!!

CO-66

INPUT

M & I Data Services

Heritage	Processing services
Focus	Banking industry
Strength	Full suite of specialized banking applications
Direction	Increase integration— IBS software sales

CO-69

INPUT



EDS

- 1992 revenues - \$8.2 billion
- 71,000 employees
- Outsourcing market leader
- Large accounts focus

CO-70

INPUT

EDS

- Targeted markets
 - Manufacturing
 - Financial
 - Government
 - Insurance
 - Health care

CO-71

INPUT

IBM

- 1992 revenues - \$65 billion
- 301,000 employees
- World information technology leader

CO-72

INPUT

IBM

- Targeted markets
 - Federal government
 - Banking
 - Manufacturing
 - State and local government
- More autonomy for divisions
- Staff reduction continues

CO-73

INPUT

Andersen Consulting

- 1992 CY revenues - \$2.7 billion
- 26,700 professionals
- Shift emphasis to front end consulting

CO-74

INPUT

Andersen Consulting

- Targeted markets
 - Manufacturing
 - Health
 - Energy
 - Consumer products

CO-75

INPUT



Systematics

- 1992 revenues - \$500 million
- 5,700 employees
- 20+ years in finance/banking
- 1,000 banking clients (30 countries)
- Subsidiary of Alltel

CO-76

INPUT

Systematics

- Targeted markets
 - Commercial banks
 - Saving and loans
 - Credit unions
 - Cellular phone companies

CO-77

INPUT

Computer Sciences Corporation

- 1992 revenues - \$2.1 billion
- 26,500 professionals
- Strong acquisition activity
- Shift emphasis to commercial

CO-78

INPUT

Computer Sciences Corporation 1992* Revenue Distribution

Delivery Mode	Revenue (\$M)
Systems Integration	570
Professional Services	719
Outsourcing	824

CO-79

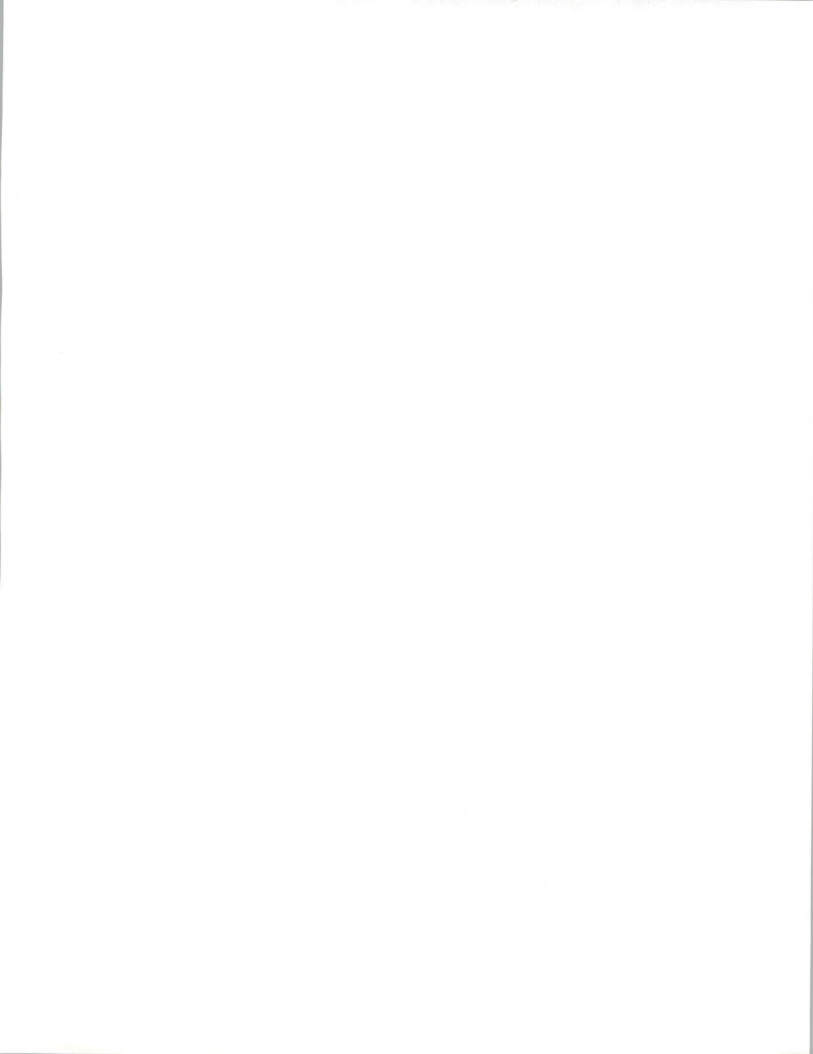
INPUT

Computer Sciences Corporation

- Targeted markets
 - Federal market leader
- Resurgent interest in
 - Health care
 - Distribution (logistics)
 - Insurance

CO-80

INPUT



23, SUMMARY & CONCLUSIONS
(SC)

Summary and Conclusions

SC-1a

INPUT

Conclusions

SC-1b

INPUT

Environment for Information Services in Year 2000

- Worldwide network infrastructure in place (ISDN)
 - Voice
 - Data
 - Text
 - Graphics

SC-2

INPUT

Environment for Information Services in Year 2000

- Simultaneous language translation/transmission
- Active home/consumer use of videotex, data base access

SC-3

INPUT

Environment for Information Services in Year 2000

- Image processing is routine
- Portable, desktop computers used by all professional/clerical/managerial workers
- Standards in place for OS, graphical interfaces

SC-4

INPUT

Environment for Information Services in Year 2000

- Fewer hardware vendors
- Solutions delivered, not products
- Software customized by nonprogrammers

SC-5

INPUT

Conclusions

- Alliances/mergers necessary
- Customer requirements becoming more sophisticated
- Customers applying professional buying
- 'Federated' IS requires complex selling

SC-6a

INPUT

Conclusions

- Selling process is key
 - Solutions-oriented
 - Professional

SC-6b

INPUT

Conclusions

- Shorter lifecycle calls for fast response
- People skills/retention are key
- Internationalism to increase
- Technology creates opportunities

SC-7

INPUT

Conclusions

- Services (people) will be the key
 - Recruiting
 - Motivation
 - Compensation
 - Training
- Targeted, disciplined marketing
- Have platforms that serve all markets
- Develop 'critical mass' in target markets
- Seek leverage from standards

SC-8a

INPUT

Conclusions

- Double-digit annual growth for all vendors
- no longer "automatic"
- Worldwide markets offer real opportunities

SC-8b

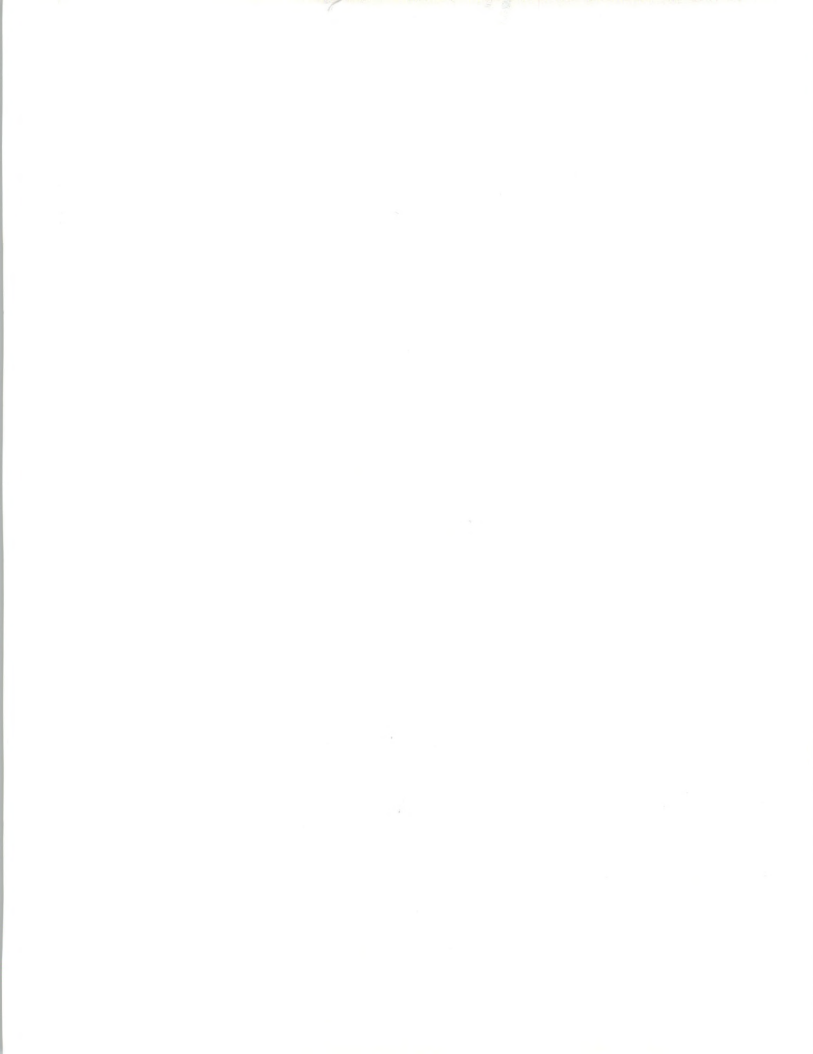
INPUT

Conclusions

- All vendors need partners
- Consolidation will continue
- Standards play key role
- Users want solutions

SC-8c

INPUT



Recommendations to Vendors

- Focus on marketing
- Establish and protect account base
- Expand scope of services to customers

SC-9

INPUT

Recommendations to Vendors

- Deliver complete solutions
- Be aware of standards, leverage them
- Develop multiplatform solutions
- Consider international markets

SC-10

INPUT

Opportunity for 1990s

- Attack in-house budgets
- Opportunity \$75-100 billion/year in U.S.

SC-11

INPUT

Available Information Services Revenue, 1989-1994

GO FOR IT!



SC-12

INPUT

Conclusions

- Overall market remains vital
- Outsourcing to grow
- Opportunities will require targeted marketing and support
- Breadth of services/products enhances market position

SC-13

INPUT

Conclusions



"Time—
The next source of
competitive advantage"
- HBR July/August 1988

- Attack opportunities
- Adjust to the requirements

SC-14

INPUT

U.S. Information Services Industry
Conclusions

- Slower growth for 1991-1996
 - Slow rebound 1991-1992
 - Market growth 10% to 15% per year
 - 1991—less than 10%
 - 1996—15%
- Maturity in some sectors

SC-15

INPUT

U.S. Information Services Industry
Conclusions

- Outsourcing will be the bright spot
 - Functions versus projects
 - Long-term agreements
 - Increased reliance on vendor
 - Increased risk for vendor

SC-16a

INPUT

U.S. Information Services Industry
Conclusions

- Vendor characteristics will change
 - Product vendors become services vendors
 - Primary vendors become secondary contractors

SC-16

INPUT

U.S. Information Services Industry
Conclusions

- Outsourcing will be the bright spot
 - Services versus products
 - Solutions versus systems
 - Primary versus secondary vendors

SC-16a

INPUT

U.S. Information Services Industry
Conclusions

- Influence of large vendors will grow
 - Partnerships/Alliances
 - Minority investments
 - Account control through services

SC-17

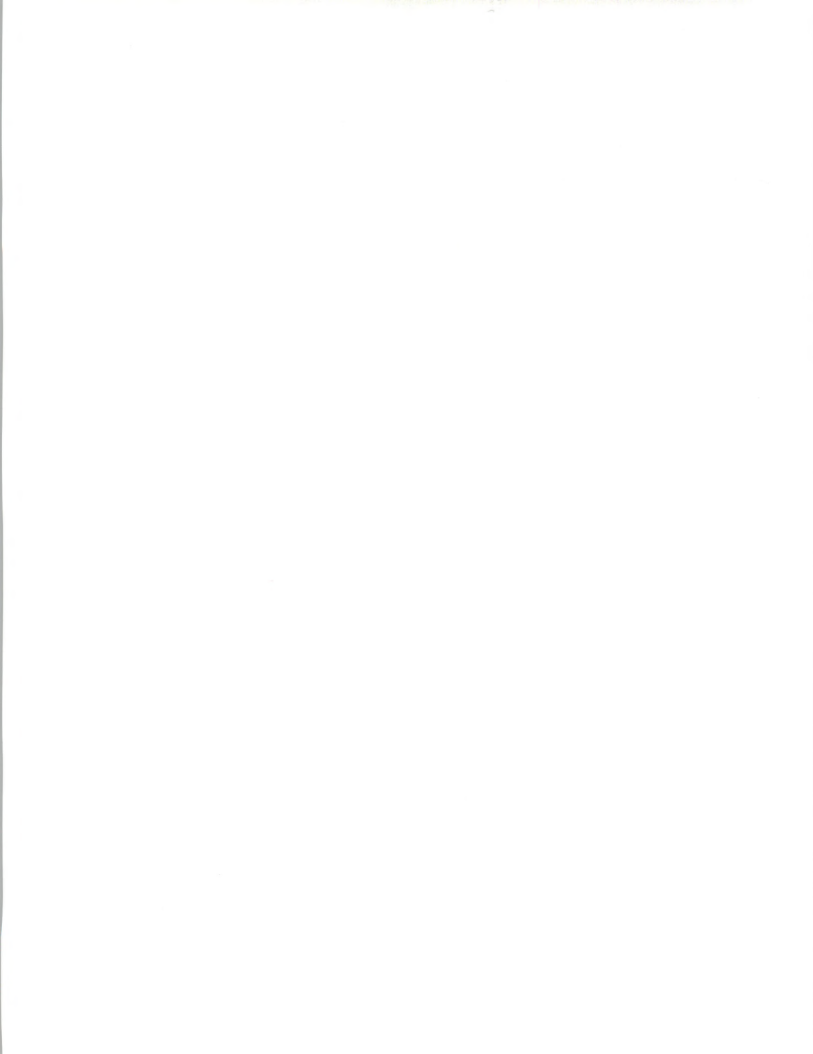
INPUT

U.S. Information Services Industry
Conclusions

- Buying characteristics are changing
 - General manager becomes primary buyer
 - IS becomes the internal consultant
 - Solution versus technology
 - Decisions become larger

SC-20

INPUT



U.S. Information Services Industry

Conclusions

- US market will become internationalized
 - Standards influence increases
 - Foreign vendors grow in size
 - Buyers ask for worldwide support

SC-21

INPUT



24, CUSTOMER SERVICES
(CS)

Customer Service Program

Annual Presentation

CS- 1

INPUT

Agenda

- Overview
- Review of traditional customer services
- Assessment of nontraditional opportunities

CS- 2

INPUT

1990 INPUT Research Base

User Research	Respondents
Large Systems	97
Midrange Systems	109
PC/Workstations	53
IMO Users	35

CS- 3

INPUT

1990 INPUT Research Base

Vendor Research	Respondents
Large Systems	5
Midrange Systems	7
PC/Workstations	5
IMO Vendors	30

CS- 4

INPUT

Traditional Services: Analysis

- Definitions
- Growth/requirements
- Vendor shares
- Independent maintenance
- Issues
- Conclusions

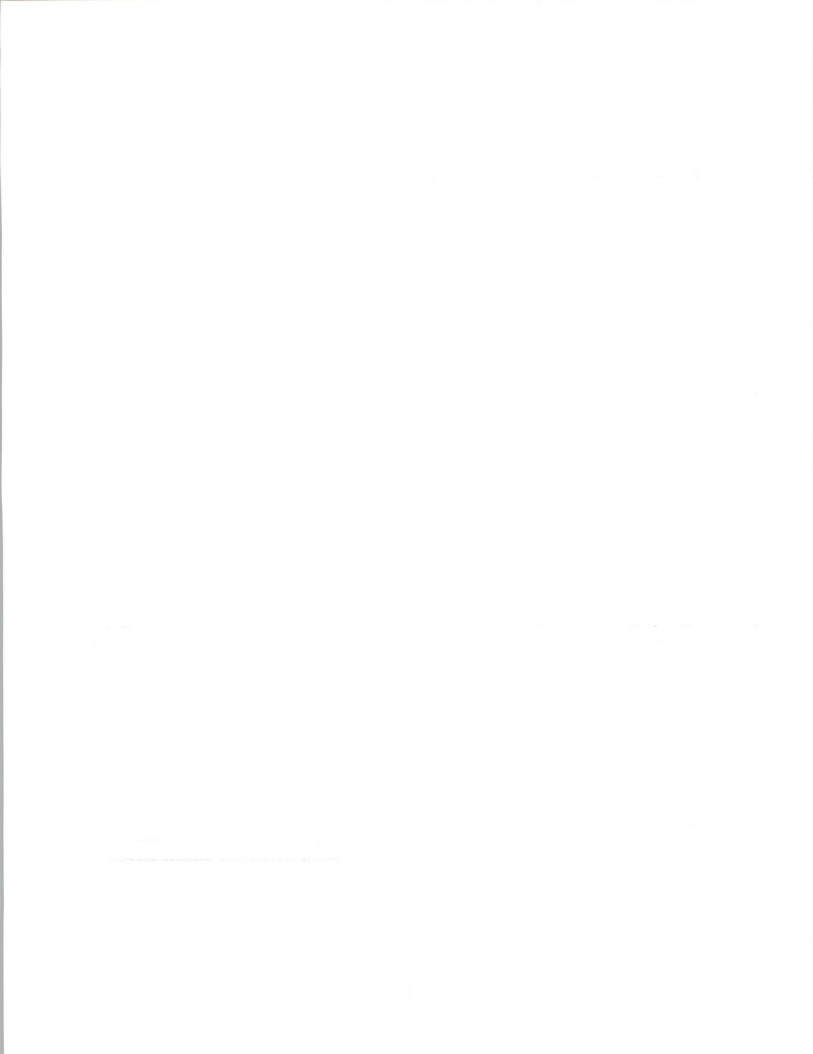
CS- 5

INPUT

Definitions

CS- 6

INPUT



Traditional Services

- Hardware/microcode oriented
- Diagnosis/repair
- Pre-failure identification

CS- 7

INPUT

Traditional Services

- Manufacturers/IMOs
 - Large systems
 - Midrange systems
 - PC/workstations
- Ancillary services

CS- 8

INPUT

Ancillary Services

- Preinstallation planning
- Installation/deinstallation
- Maintenance training
- Related to traditional services

CS- 9

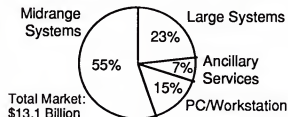
INPUT

Growth/ Requirements

CS- 10

INPUT

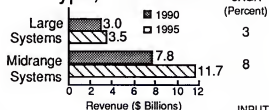
1989 U.S. Customer Service Market by Product Type



CS- 11

INPUT

U. S. Customer Service Market Growth by Product Type, 1990-1995



CS- 12

INPUT

1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

2. The second part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

3. The third part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

4. The fourth part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

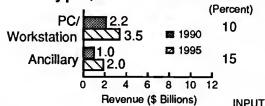
5. The fifth part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

6. The sixth part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

7. The seventh part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

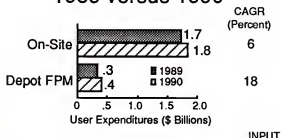
8. The eighth part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

U. S. Customer Service Market Growth by Product Type, 1990-1995



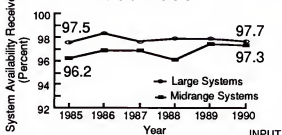
CS-13

On-Site and Depot Markets, 1989 versus 1990



CS-14

System Availability Trends, 1985-1990



CS-15

Customer Service Revenue Growth: Opposing Factors



- IBM price umbrella
- Need to increase overall profitability
- Installed base growth

INPUT

CS-16

Customer Service Revenue Growth: Opposing Factors



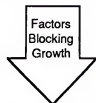
- Inflation
- Increased availability need
- New services

INPUT

CS-17

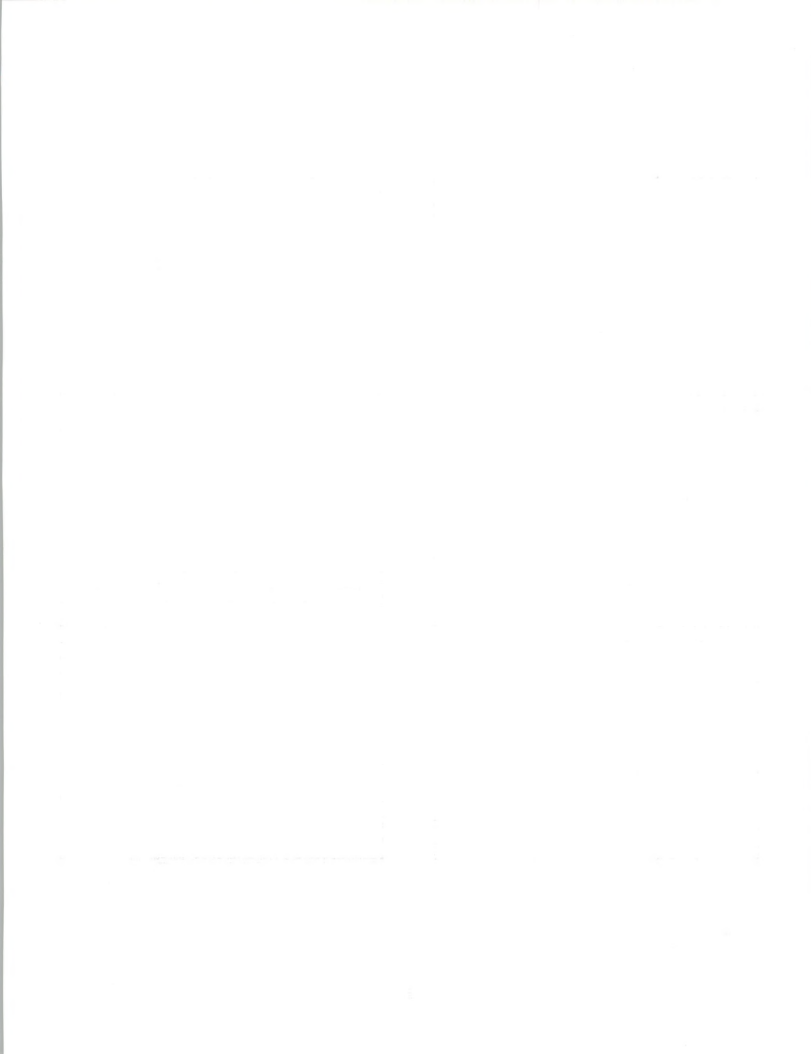
Customer Service Revenue Growth: Opposing Factors

- TPM competition
- Cost of ownership
- Equipment retirement
- Customer resistance
- Increased availability



INPUT

CS-18

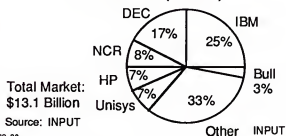


Vendor Shares

CS-19

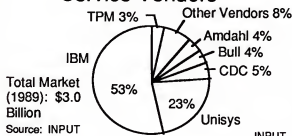
INPUT

Leading U.S. Service Providers (1989)



CS-20

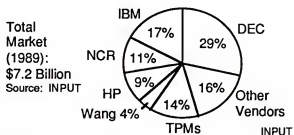
Leading Large System Service Vendors



CS-21

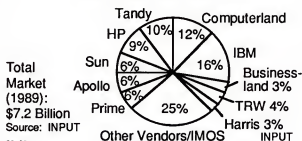
INPUT

Leading Midrange Service Vendors



CS-22

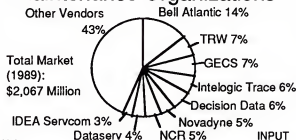
Leading PC/Workstation Service Vendors



CS-23

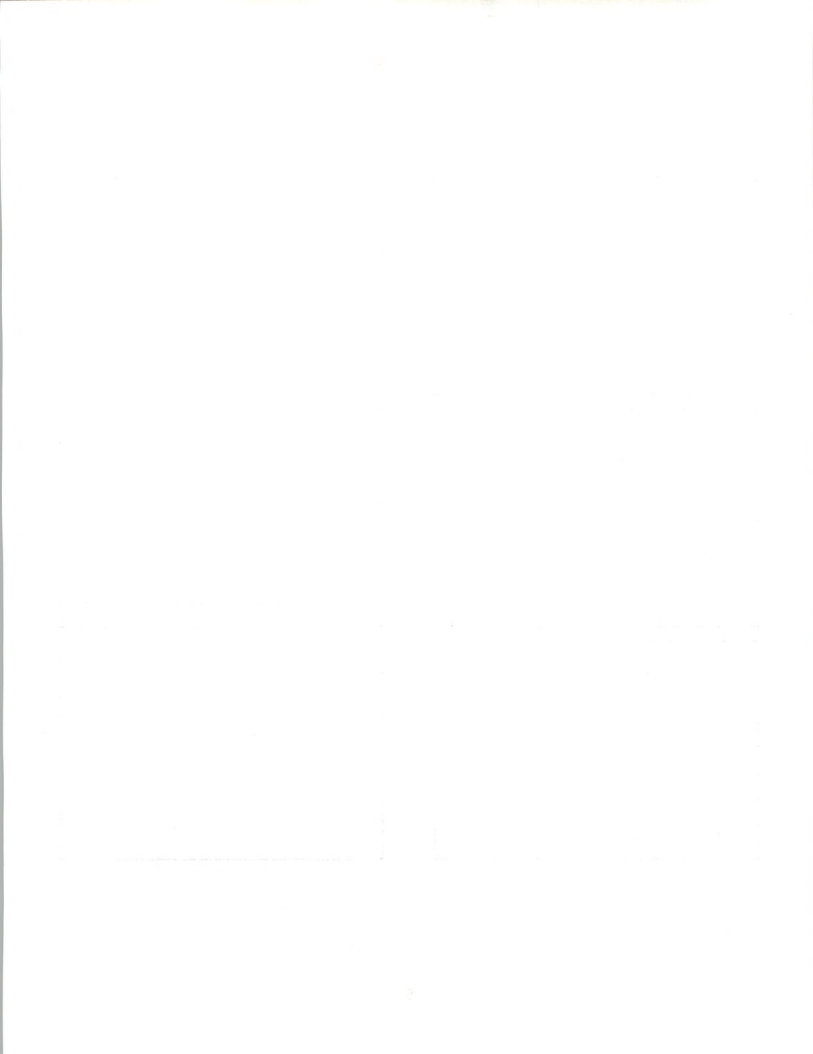
INPUT

Top Independent Maintenance Organizations

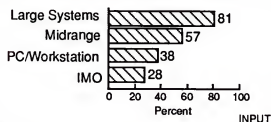


CS-24

INPUT



Combined Market Share of Top Three Service Vendors



CS-25

Independent Maintenance Organizations (IMO)

INPUT

CS-26

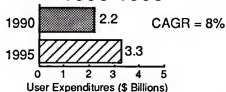
IMO vs. TPM

- "Third-party maintenance" virtually universal
- Independence is critical issue

INPUT

CS-27

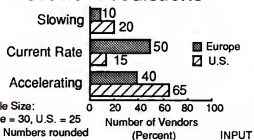
U.S. Independent Maintenance Market, 1990-1995



INPUT

CS-28

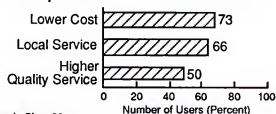
Independent Vendor Growth Predictions



Sample Size:
Europe = 30, U.S. = 25
Note: Numbers rounded

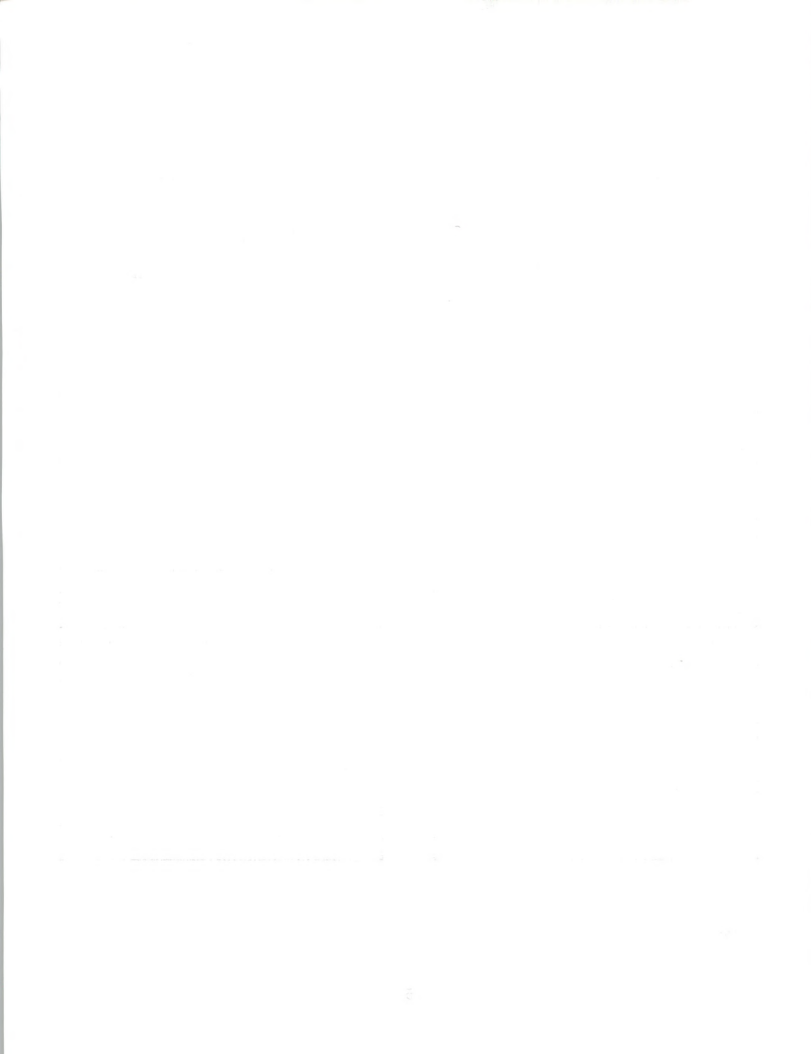
CS-29

Why Users Chose Independent Maintenance

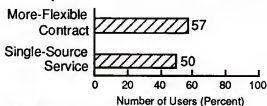


Sample Size: 30
Note: Multiple responses allowed

CS-30



Why Users Chose Independent Maintenance



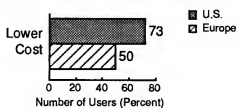
Sample Size: 30

Note: Multiple responses allowed

INPUT

CS-31

Why Users Chose Independent Maintenance



CS-32

INPUT

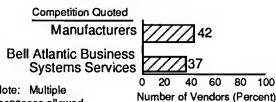
Independent Maintenance Market Inhibitors

- Limited price sensitivity
- Independent's software support credibility
- Fear of equipment vendor reaction

INPUT

CS-33

Independent Maintenance Primary Sources of Competition

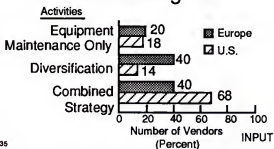


Note: Multiple responses allowed

CS-34

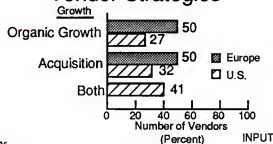
INPUT

Leading Independent Vendor Strategies



CS-35

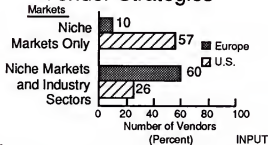
Leading Independent Vendor Strategies



CS-36

INPUT

Leading Independent Vendor Strategies



CS-37

Independent Vendor Strengths, U.S.

1. Price
2. Quality/reliable service
3. Technical knowledge
4. Responsive to user needs
5. Coverage—single service

INPUT

CS-38

Independent Vendor Weaknesses, U.S.

- Spare parts
- Knowledge of system advances

INPUT

CS-39

Independent Vendor Strengths, Europe

1. Responsiveness
2. Provision of multivendor service
3. Availability of independent and unbiased advice

INPUT

CS-40

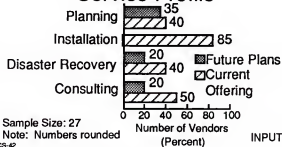
Independent Vendor Weaknesses, Europe

- Software support credibility
- Risk of overexposure
- Larger companies run risk of losing user friendliness
- Lack of intimate product knowledge

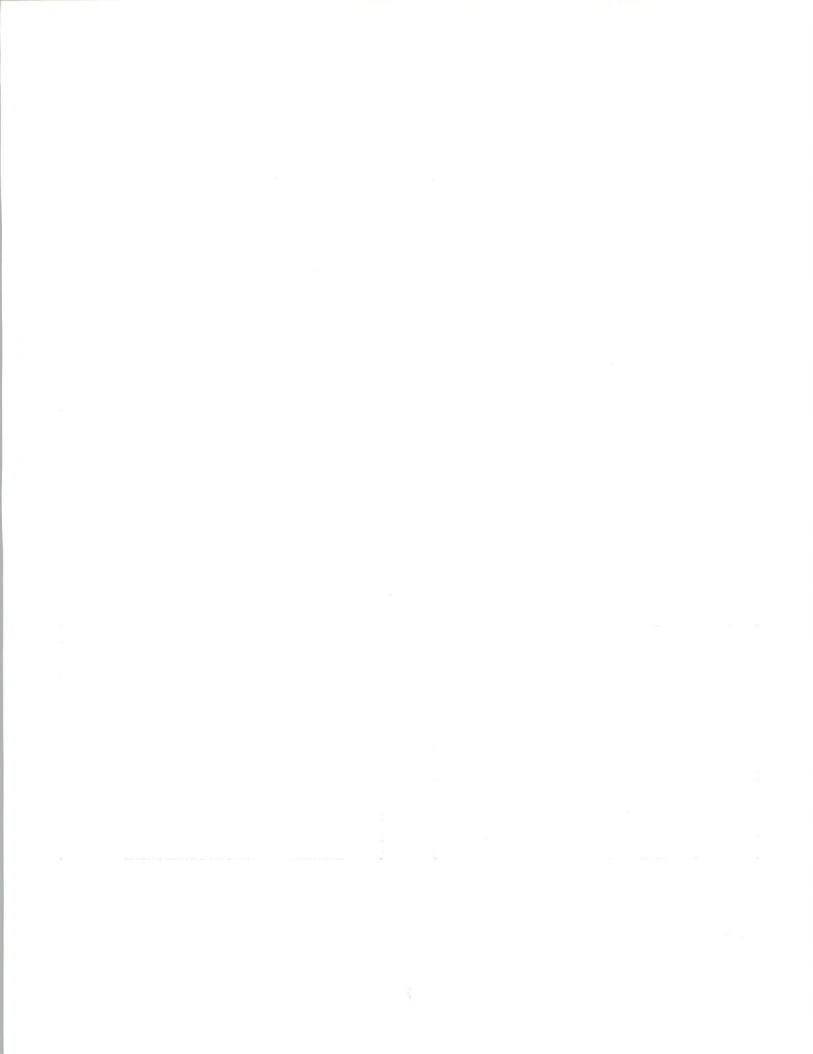
INPUT

CS-41

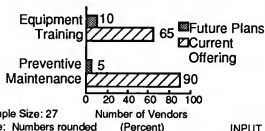
U.S. Independent Vendor: Service Profile



CS-42

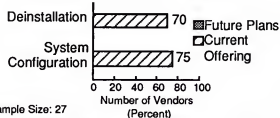


Leading U.S. Independent Vendor: Service Profile



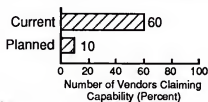
INPUT

Leading U.S. Independent Vendor: Service Profile



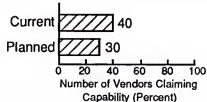
INPUT

U.S. Independent Vendor Systems Software Support



INPUT

U.S. Independent Vendor Applications Software Support



INPUT

Vendor Reaction to Independents' Success

- Competitive response
 - Pricing flexibility
 - Price discounting
 - Warranties
 - Bundling
 - Special contracts

INPUT

Vendor Reaction to Independents' Success

- Service initiatives
 - Single-source/multivendor
 - Integrated solutions
 - Software support

INPUT

Date	Description	Amount	Balance	Interest	Total	Notes	Ref.	Page
1890								
Jan 1	Balance	100.00	100.00					
Feb 1	Interest	1.00	101.00					
Mar 1	Interest	1.00	102.00					
Apr 1	Interest	1.00	103.00					
May 1	Interest	1.00	104.00					
Jun 1	Interest	1.00	105.00					
Jul 1	Interest	1.00	106.00					
Aug 1	Interest	1.00	107.00					
Sep 1	Interest	1.00	108.00					
Oct 1	Interest	1.00	109.00					
Nov 1	Interest	1.00	110.00					
Dec 1	Interest	1.00	111.00					
1891								
Jan 1	Balance	111.00	111.00					
Feb 1	Interest	1.00	112.00					
Mar 1	Interest	1.00	113.00					
Apr 1	Interest	1.00	114.00					
May 1	Interest	1.00	115.00					
Jun 1	Interest	1.00	116.00					
Jul 1	Interest	1.00	117.00					
Aug 1	Interest	1.00	118.00					
Sep 1	Interest	1.00	119.00					
Oct 1	Interest	1.00	120.00					
Nov 1	Interest	1.00	121.00					
Dec 1	Interest	1.00	122.00					
1892								
Jan 1	Balance	122.00	122.00					
Feb 1	Interest	1.00	123.00					
Mar 1	Interest	1.00	124.00					
Apr 1	Interest	1.00	125.00					
May 1	Interest	1.00	126.00					
Jun 1	Interest	1.00	127.00					
Jul 1	Interest	1.00	128.00					
Aug 1	Interest	1.00	129.00					
Sep 1	Interest	1.00	130.00					
Oct 1	Interest	1.00	131.00					
Nov 1	Interest	1.00	132.00					
Dec 1	Interest	1.00	133.00					
1893								
Jan 1	Balance	133.00	133.00					
Feb 1	Interest	1.00	134.00					
Mar 1	Interest	1.00	135.00					
Apr 1	Interest	1.00	136.00					
May 1	Interest	1.00	137.00					
Jun 1	Interest	1.00	138.00					
Jul 1	Interest	1.00	139.00					
Aug 1	Interest	1.00	140.00					
Sep 1	Interest	1.00	141.00					
Oct 1	Interest	1.00	142.00					
Nov 1	Interest	1.00	143.00					
Dec 1	Interest	1.00	144.00					

Vendor Reaction to Independents' Success

- Cooperative partnerships
- Restrictive practices
 - Parts
 - Documentation
 - Diagnostic software

CS-49

INPUT

Issues

- IBM
- Single-source service
- Remote monitoring
- Recession

CS-50

INPUT

IBM: Dissolution of NSD

- First, planning/financial to area marketing staff
- Midyear: service management report directly to branch/area

CS-51

INPUT

IBM: Dissolution of NSD

- Part of move to decentralize all services—occurred earlier with professional services

CS-52

INPUT

Other IBM Activities

- Field upgrades for ES9000
- Partial integration of field service with manufacturing
- FastService: troubleshooting for in-house applications

CS-53

INPUT

Single-Source Service

CS-54

INPUT

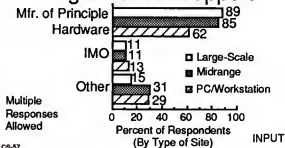
Single-Source Service

- User receptivity
- Technical issue
- Partnership vs. competition
- Pricing

CS-55

INPUT

Preferred Source of Single-Vendor Support



CS-57

INPUT

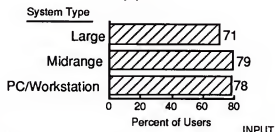
DEC: Single-Source Service

- Centralized, transparent help desk
- Problem identification and referral
- Software partner oriented
- DEC or partner can be focal point
- Good reception by software partners

CS-58

INPUT

Interest in Single-Vendor Support



CS-56

INPUT

Single-Source Technical Issues

- Expanded hardware/software knowledge base
- Problem/solution data base
- Help desk/problem tracking

CS-58

INPUT

Single-Source Service: Strategic Issues

- Offensive vs. defensive
- Gain/retain partner
 - Hardware
 - Systems software
 - Applications

CS-60

INPUT

Single-Source Service: Strategic Issues

- Protect installed base
- Add value, raise prices

CS-41

INPUT

Remote Monitoring

- Technical aspects
- Competitive advantage
- Opportunities

CS-42

INPUT

Monitoring: Technical

- Device-resident
- Parameter-driven
- Problem "footprints"
- Expert system/data base

CS-43

INPUT

Monitoring: Competitive Advantage

- Real customer benefits
- Perceived customer benefits
- Expert system software (medium)
- "Footprint" data base (high)

CS-44

INPUT

Monitoring: Opportunities

- Manufacturers—build walls against third parties
- Partnerships/alliances
 - Between third parties
 - Manufacturers—others
- Extend technology to software

CS-45

INPUT

Recession Impact

CS-46

INPUT

Date	Description	Debit	Credit	Balance
1891				
Jan 1	Balance forward			100.00
Jan 15	Wages	50.00		50.00
Jan 20	Expenses	25.00		25.00
Jan 25	Income		75.00	100.00
Feb 1	Balance forward			100.00
Feb 10	Wages	60.00		40.00
Feb 15	Expenses	30.00		10.00
Feb 20	Income		80.00	90.00
Feb 25	Wages	40.00		50.00
Feb 28	Expenses	20.00		30.00
Mar 1	Balance forward			30.00
Mar 10	Income		70.00	100.00
Mar 15	Wages	50.00		50.00
Mar 20	Expenses	30.00		20.00
Mar 25	Income		80.00	100.00
Mar 31	Balance forward			100.00
Apr 1	Balance forward			100.00
Apr 10	Wages	60.00		40.00
Apr 15	Expenses	30.00		10.00
Apr 20	Income		80.00	90.00
Apr 25	Wages	40.00		50.00
Apr 28	Expenses	20.00		30.00
May 1	Balance forward			30.00
May 10	Income		70.00	100.00
May 15	Wages	50.00		50.00
May 20	Expenses	30.00		20.00
May 25	Income		80.00	100.00
May 31	Balance forward			100.00
Jun 1	Balance forward			100.00
Jun 10	Wages	60.00		40.00
Jun 15	Expenses	30.00		10.00
Jun 20	Income		80.00	90.00
Jun 25	Wages	40.00		50.00
Jun 28	Expenses	20.00		30.00
Jul 1	Balance forward			30.00
Jul 10	Income		70.00	100.00
Jul 15	Wages	50.00		50.00
Jul 20	Expenses	30.00		20.00
Jul 25	Income		80.00	100.00
Jul 31	Balance forward			100.00
Aug 1	Balance forward			100.00
Aug 10	Wages	60.00		40.00
Aug 15	Expenses	30.00		10.00
Aug 20	Income		80.00	90.00
Aug 25	Wages	40.00		50.00
Aug 28	Expenses	20.00		30.00
Sep 1	Balance forward			30.00
Sep 10	Income		70.00	100.00
Sep 15	Wages	50.00		50.00
Sep 20	Expenses	30.00		20.00
Sep 25	Income		80.00	100.00
Sep 30	Balance forward			100.00
Oct 1	Balance forward			100.00
Oct 10	Wages	60.00		40.00
Oct 15	Expenses	30.00		10.00
Oct 20	Income		80.00	90.00
Oct 25	Wages	40.00		50.00
Oct 28	Expenses	20.00		30.00
Nov 1	Balance forward			30.00
Nov 10	Income		70.00	100.00
Nov 15	Wages	50.00		50.00
Nov 20	Expenses	30.00		20.00
Nov 25	Income		80.00	100.00
Nov 30	Balance forward			100.00
Dec 1	Balance forward			100.00
Dec 10	Wages	60.00		40.00
Dec 15	Expenses	30.00		10.00
Dec 20	Income		80.00	90.00
Dec 25	Wages	40.00		50.00
Dec 28	Expenses	20.00		30.00
Dec 31	Balance forward			30.00

Impact of the Recession on Vendors and IMOs

Impact	Percentage of Vendors and IMOs
Negative	30
Positive	10
Both	30

CS-67

INPUT

Budgetary Measures in Relation to Economic Downturn

Measure	Percentage of Respondents
Personnel Cut Backs	40
Overtime Reduction	10

CS-68

INPUT

Budgetary Measures in Relation to Economic Downturn

Measure	Percentage of Respondents
Hiring Freeze	30
Reduce/Tighten Budgets	60

CS-69

INPUT

Budgetary Measures in Relation to Economic Downturn

Measure	Percentage of Respondents
Stronger Justification for Expenses	100
Space Consolidation	10

CS-70

INPUT

Traditional Customer Services vs. Nontraditional Customer Services

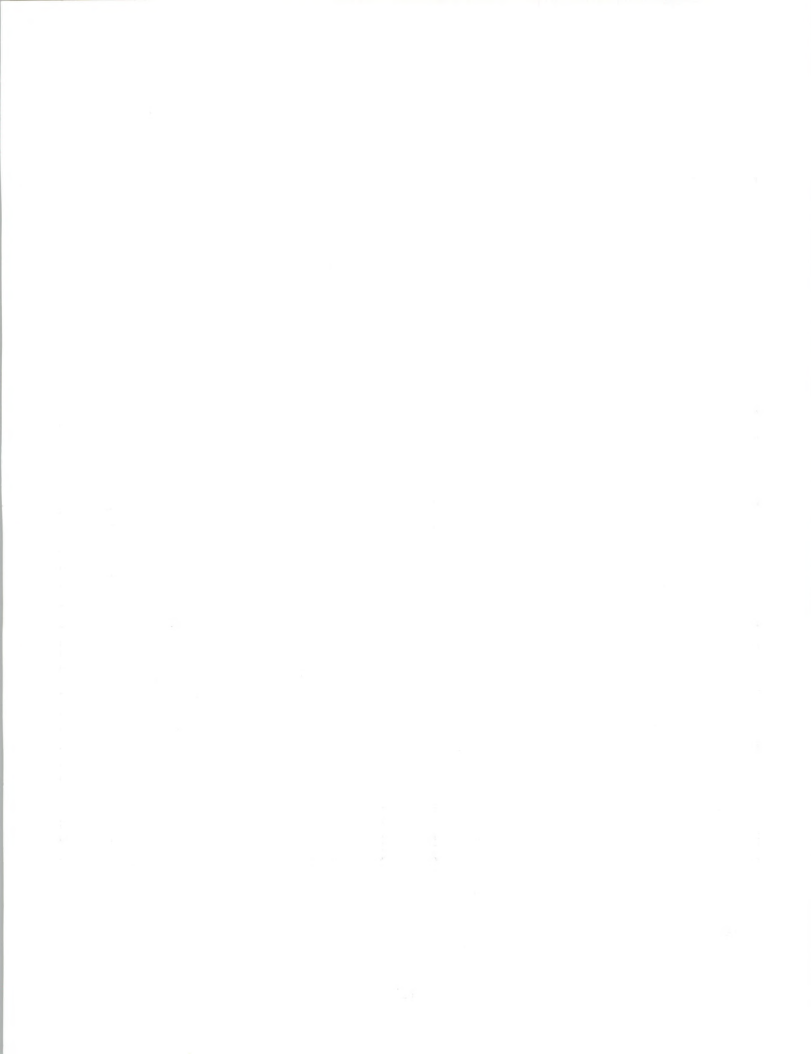
CS-71

INPUT

Nontraditional Opportunities

CS-72

INPUT



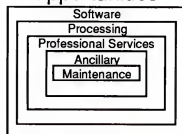
Definitions/Requirements

- Growth prospects
- Customer acceptance
- Competition

CS-73

INPUT

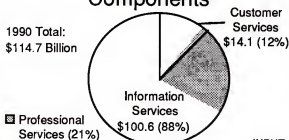
Information Services Opportunities



CS-74

INPUT

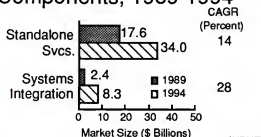
Professional Services Components



CS-75

INPUT

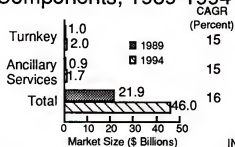
U.S. Professional Services Components, 1989-1994



CS-76

INPUT

U.S. Professional Services Components, 1989-1994



CS-77

INPUT

Professional Services Opportunities

- Systems operations: good
 - Fluid, competitive situation
- Applications support: good
 - Existing systems
 - Need project mgt. and technical skills

CS-83

INPUT



Professional Services Opportunities

- Consulting: fair/good
 - Depends on skills available
- Applications development: limited
 - New systems
 - Highly competitive

CS-84

INPUT

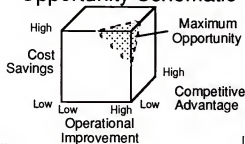
Professional Services Opportunities

- Systems integration: limited
 - Enter at later phase
- Turnkey: none
 - Closely tied to software products

CS-85

INPUT

Systems Operations: Opportunity Schematic



CS-89

INPUT

Network Service

CS-90

INPUT

Network Service Overview

	Network Integration	Network Operations
Professional Services	Yes	Yes
Products/Other Services	No	No

CS-91

INPUT

Network Integration Professional Services

- Network design
 - Strategic planning
 - Requirements analysis
 - Design
- Installation planning

CS-92

INPUT



Network Integration Professional Services

- Implementation
 - Equipment/modification
 - Circuits/cabling
 - Software
 - Initial training

CS-93

INPUT

Network Operations Professional Services

- Configuration management
- Problem management
- Capacity management
- Network administration
- Management reporting

CS-94

INPUT

Network Service: Products/Other Services

- Network integration
 - Equipment supply
 - Circuits
 - Software products
- Network operations
 - Transmission-related services

CS-95

INPUT

Network Service Requirements

CS-96

INPUT

Key User Network Service Needs

- Network access
- Improved vendor expertise
- Flexible service offerings
- Single point of contact

CS-97

INPUT

Key Vendor Network Service Requirements

Vendor Requirement	Importance Rating
Need to work in multivendor environment	High
Need for a wider range of skills	High

CS-98

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Key Vendor Network Service Requirements

Vendor Requirement	Importance Rating
Compatibility of software	Medium
Need to structure a wider-ranging service	Medium

CS-99

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Service Skill Profile

Service	Importance Rating	
	Computer Systems	Networks
Consulting	Medium	High
Environmental/ installation services	Medium	High

CS-100

INPUT

Service Skill Profile

Service	Importance Rating	
	Computer Systems	Networks
Project management/ implementation	Low	Medium
Applications support	Low	Medium

CS-101

INPUT

Service Skill Profile

Service	Importance Rating	
	Computer Systems	Networks
Systems software support	High	High
Equipment maintenance	High	Low/Medium

CS-102

INPUT

Potential for Customer Service Organizations to Offer Network Service

Strengths	Weaknesses
Increasing network and software orientation	Competition from other divisions
Geographic coverage	

CS-103

INPUT

Potential for Customer Service Organizations to Offer Network Service

Strengths	Weaknesses
Service orientation	Historic hardware orientation

CS-104

INPUT



Potential for Systems Integrators to Offer Network Service

Strengths	Weaknesses
Software-oriented	Usually, the network and hardware skills
Multiple-platform experience	

CS-105

INPUT

Potential for Systems Integrators to Offer Network Service

Strengths	Weaknesses
Broad technical skills	Development, not service, orientation

CS-106

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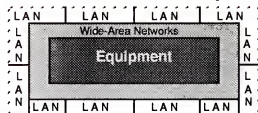
Potential for Software Product Companies to Offer Network Service

Strengths	Weaknesses
Software and software support knowledge	Often little communications experience
	Product-oriented

CS-107

INPUT

Disaster Recovery

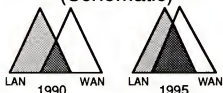


- Good commercial offerings
- Variable commercial offerings
- No commercial offerings

CS-108

INPUT

Converging Network Service Requirements (Schematic)



- LAN = Local-Area Networks
- WAN = Wide-Area Networks

CS-109

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network importance to customer	Very high	Varies widely

CS-110

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Networking standards and protocols	IBM (de facto)	No vendor dominates

CS-111

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Networking software	IBM (de facto)	Multiple vendors

CS-112

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Maturity of network management tools	Medium	Low

CS-113

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network management skills	Defined	Being defined

CS-114

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network management organization	Within IS	Widely dispersed

CS-115

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network management costs (corporate)	Very high	Being defined

CS-116

INPUT



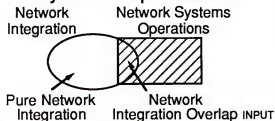
Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Outsourcing of network operation	Occurring	Issues being defined

CS-117

INPUT

Overlap of Network Integration and Network Systems Operations



CS-118

INPUT

Network Integration: "Pure" vs. Network Operations Overlap

- Pure Network Integration
 - Megaprojects
 - Application-driven
 - Standalone projects

CS-119

INPUT

Network Integration: "Pure" vs. Network Operations Overlap

- Overlap
 - Smaller projects
 - Little applications content
 - Evolutionary changes

CS-120

INPUT

Network Operations: Opportunities

- Recently acquired divisions
- Operations being prepared for divestitures
- Companies under financial pressure

CS-121

INPUT

Network Operations: Opportunities

- Inefficient operations
- Technical laggards
- IS management turnover
- Relatively stable applications

CS-122

INPUT



Network Operations: Total Service Opportunities

- Network monitoring, performance analysis
- Problem management
- Terminal installation
- Disaster recovery

CS-123

INPUT

Network Operations: Total Service Opportunities

- Training and education
- User help desk
- Equipment service
- Systems software support

CS-124

INPUT

Network Integration: Total Service Opportunities

- Installation
- Test and acceptance
- Facility wiring and cabling

CS-125

INPUT



25. Client/Server (CL)

Client/Server (CL)

INPUT

CL- 1

Application Attributes Favoring Server Residency

- Large/modular application code
- Frequently updated
- Accessed from many locations
- Highly sensitive data
- Many people accessing
- Much collaborative work

INPUT

CL- 2

Application Attributes Favoring Client Residency

- Small application code
- Rarely updated
- Accessed from few locations
- Data not sensitive
- Few people accessing
- Little collaborative work

INPUT

CL- 3

Expected Gain from C/S Architecture

Lower costs	89 %
Improved application development	56
Better systems management	45
Faster data access	45
Other	43

INPUT

CL- 4

Perceived Inadequacies Installed C/S Applications

Lack of system management tools	78%
Increased support requirements	75
Increased user training requirements	45

INPUT

CL- 5

Perceived Inadequacies Installed C/S Applications

Client not powerful enough	44%
Lack of application environment	22
Other	67

INPUT

CL- 6



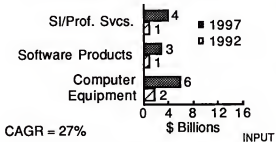
Reasons for NOT Implementing Client/Server Architectures

Lack of experience	44%
Don't know how to support	19
Too large a job	13

INPUT

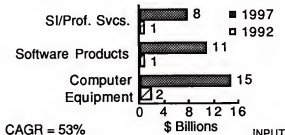
CL- 7

Client/Server Architecture Forecast—Pessimistic



CL- 8

Client/Server Architecture Forecast—Optimistic



INPUT

CL- 9

Client/Server Driving Forces

- Vendor self-interest
- Product availability
- Expected benefits
- Absorption rate of new technologies

INPUT

CL- 10

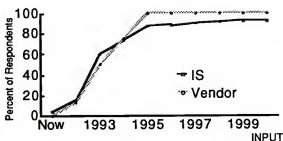
C/S Architecture as a Percent of Total Expenditures

	1992 (%)	1997 (%)
Software	<1	4-10
Services (PS/SI)	<1	8-15
Computer Equipment	2	6-15

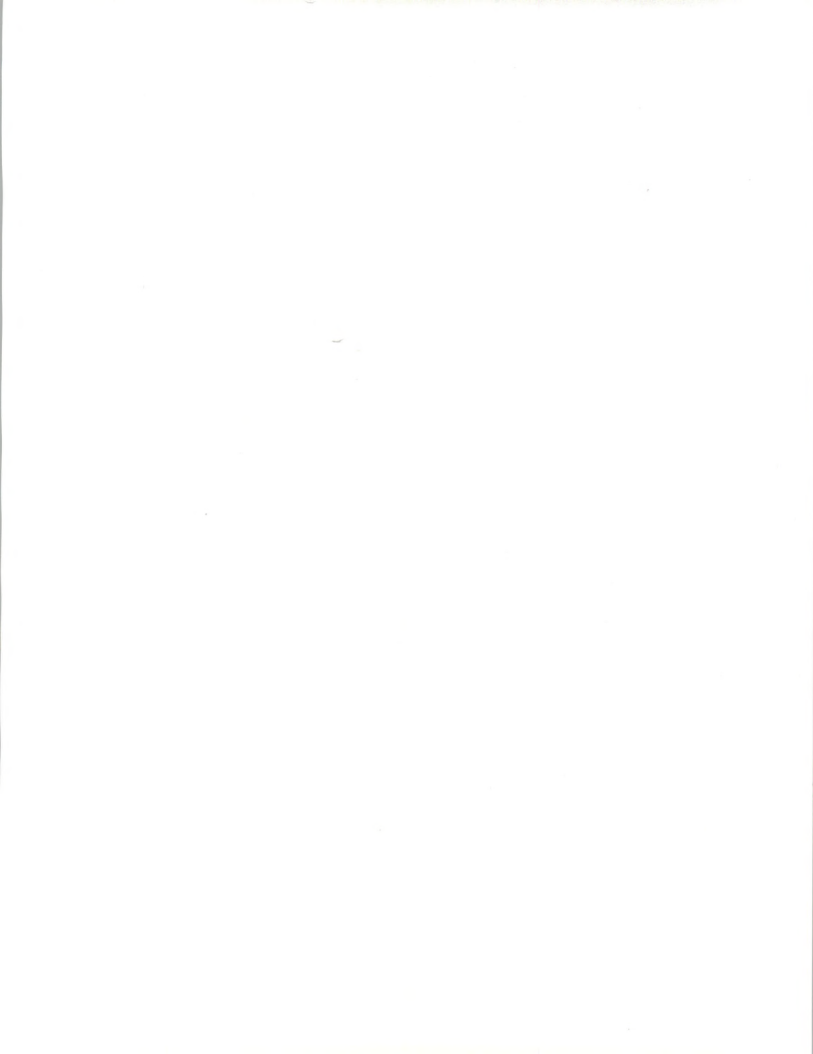
INPUT

CL- 11

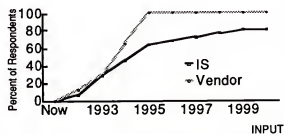
Anticipated Timing of Significant C/S Implementations



CL- 12

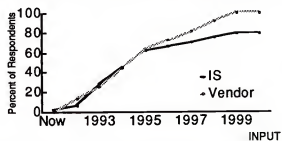


Anticipated Infrastructure Changes Major Applications to C/S



GL-15

Anticipated Infrastructure Changes C/S Is Predominant Architecture



GL-16

